A STUDY OF POST-OPERATIVE OUTCOMES OF OPEN VERSUS CLOSED HEMORRHOIDECTOMY

Dissertation submitted to

THE TAMILNADU Dr. M. G. R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations for the award of the degree of

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CHENGALPATTU MEDICAL COLLEGE

THE TAMILNADU Dr. M. G. R. MEDICAL UNIVERSITY

CHENNAI, TAMILNADU

APRIL 2014

CERTIFICATE

This is to certify that this dissertation titled **"A STUDY OF POST-OPERATIVE OUTCOMES OF OPEN VERSUS CLOSED HEMORRHOIDECTOMY"** has been prepared by **Dr.R.SURESH KUMAR**, under my supervision in the Department of General Surgery, Chengalpattu Medical College , Chengalpattu, during the academic period 2011 – 2014, and is being submitted to The Tamilnadu Dr.M.G.R. Medical University, Chennai, in partial fulfillment of the University regulation for the award of the Degree "Master Of Surgery" (M.S.,General Surgery) and his dissertation is a bonafide work.

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DECLARATION

I, **Dr.R.SURESH KUMAR**, solemnly declare that the dissertation **"A STUDY OF POST-OPERATIVE OUTCOMES OF OPEN VERSUS CLOSED HEMORRHOIDECTOMY"** a bonafide work done by me in the Department of General Surgery, Chengalpattu Medical College, Chengalpattu, Under the able guidance of Prof. Dr. G. Raja Billy Graham M.S, Professor & Head of the Department, Department of General Surgery, Chengalpattu Medical College, Chengalpattu.

Place: Chengalpattu

Date : **(Dr.R.SURESH KUMAR)**

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INSTITUITIONAL ETHICS COMMITTEE

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APPROVAL OF ETHICAL COMMITTEE

TO

Dr. Suresh Kumar. R.

Dear Dr.

The Institutional Ethical committee of Chengalpattu Medical College & Hospital reviewed and discussed your application to conduct the clinical trial /dissertation work entitled

A Study of post-operative outcomes of open Vessus closed Hemorrhoidectomy

On--14/2/13---------

The following documents reviewed

a. Trial protocol, dated----------version no
b. Patient information sheet and informed consent form in English and/or vernacular language.
c. Investigators Brochure ,dated----------version
d. Principal investigators current
e. Investigators undertaking

The following members of the Ethics committee were present at the meeting held on

Date --14/2/13----------time----1.30pm----place----Chengalpattu Medical college

J Ram
14.2.13.
----------Chairman Ethics committee

14/2/13
----------member secretary of Ethics committee

Name of each member with designation

Biological scientist

Clinical member

1

2.

Nonclinical member

Lawyer

Member from nongovernment voluntary

Organisation

Philosopher

Lay person

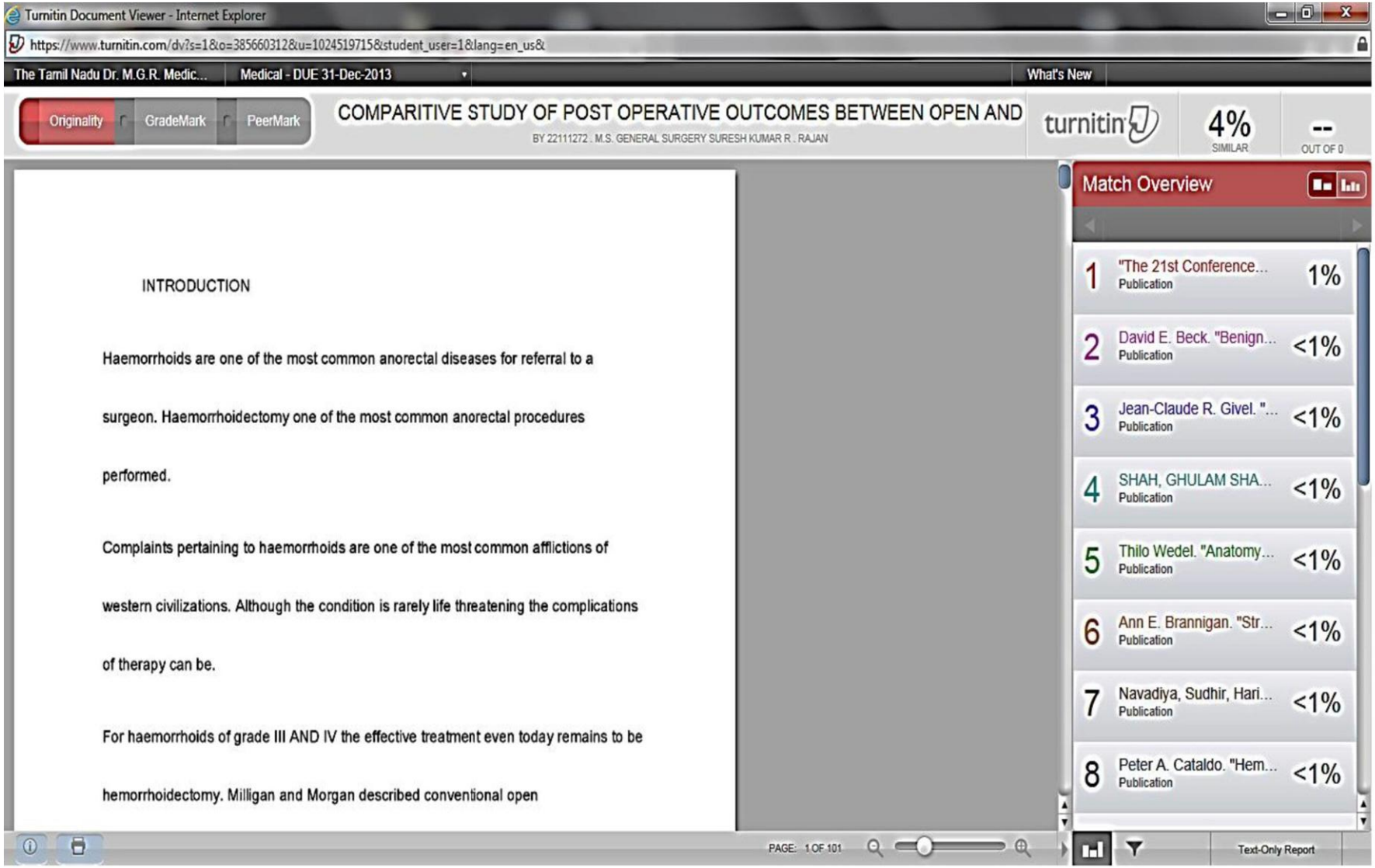
We approve the clinical trial to be conducted in its presented form

The Institutional Ethics committee expects to be informed about the progress of the study, and any SAE occurring in the course of the study, any changes in protocol and patient information/informed consent and asks to provide copy of final report.

Yours sincerely

14/2/13

Member secretory, Ethics committee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INTRODUCTION
Haemorrhoids are one of the most common anorectal diseases for referral to a surgeon. Haemorrhoidectomy one of the most common anorectal procedures performed.
Complaints pertaining to haemorrhoids are one of the most common afflictions of western civilizations. Although the condition is rarely life threatening the complications of therapy can be.
For haemorrhoids of grade III AND IV the effective treatment even today remains to be hemorrhoidectomy. Milligan and Morgan described conventional open
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ABSTRACT

Milligan-Morgan excision haemorrhoidectomy remains a very popular treatment modality for third and fourth degree hemorrhoids due to its cost effectiveness and better long-term results. Ferguson haemorrhoidectomy is believed to result in less postoperative pain because of a closed wound. The aim of this study was to compare the effectiveness of Milligan-Morgan excision haemorrhoidectomy with Ferguson haemorrhoidectomy,

Methods:

A prospective clinical trial was conducted. Patients with newly diagnosed hemorrhoids requiring haemorrhoidectomy were randomized to either Milligan-Morgan excision haemorrhoidectomy or Ferguson haemorrhoidectomy. Surgical technique and prospective care was standardized. Outcome measures were operative time and bleeding, postoperative pain (measured on visual analogue scale) and rate of wound healing.

Results:

About Sixty Patients Undergoing Hemorrhoidectomy In our Hospital, Who Have Fulfilled The Criteria Have Been Selected And Included In Our Study. Patients Are Randomized In To Two Groups. Group A Will Have 30 Patients Undergoing Open Hemorrhoidectomy. And Group B Will Have 30 Patients Undergoing Closed Hemorrhoidectomy.

The Mean Age Of Group A Sample Was 39.1 Yrs . The Mean Age Of Group B Was 37.77 Yrs

In Group A Mean Operation Time in Minutes Was 40.5. In Group B the Mean Operation Time In Minutes Was 49.33. . The Operating Time for Open Hemorrhoidectomy Was Significantly Less Than Closed Hemorrhoidectomy.

In Our Study the Mean Pain Score at 6 Hours Was 6.6 for Group A And 5.56 For Group B. The Pain Score at 6 Hours Was Significantly Low In Closed Hemorrhoidectomy with P Value of 0.0003 .The Mean Score At 24 Hrs For Group A Was 5.133 And 4.6 For Group B Which Was Also Statistically Significant With p Value Of 0.015.But The Mean Pain Score At 48 Hrs, 3 Days And 7 Days Did Not Show Any Significant Difference Between The Two Groups. Hence The Early Post Operative Pain Was Significantly Low In Closed Hemorrhoidectomy Group In Comparison To Open Approach.

The Post Defecation Pain Score Following Hemorrhoidectomy Is Significantly Low For Closed Hemorrhoidectomy In Comparison To Open Approach.

The Mean Analgesic Requirement For Group A Is 2.2 And Group B Is 1.7 With P Value Of 0.004. Thus The Analgesic Requirement Is also Low For The Closed Hemorrhoidectomy Group.

The Post Operative Complication Were Noted In Both The Groups Following Open And Closed Approach Without Any Significant Difference.

Conclusion

There Are Reports Of Better Post Operative Outcome Following Closed Hemorrhoidectomy In Terms Of Pain And Wound Healing. Both Open And Closed Approach Are Less Expensive And Safe, Easy To Perform With Satisfactory Results.

In Short We Think That Patients With Grade III And IV Hemorrhoids Who Are Operated With Fergusons Closed Hemorrhoidectomy Have Better Results.

Key words

Haemorrhoidectomy, bleeding, analgesic , post-operative pain,

INTRODUCTION

Haemorrhoids are one of the most common anorectal diseases for referral to a surgeon. Haemorrhoidectomy one of the most common anorectal procedures performed.

Complaints pertaining to haemorrhoids are one of the most common afflictions of western civilizations. Although the condition is rarely life threatening the complications of therapy can be.

For haemorrhoids of grade III AND IV the effective treatment even today remains to be hemorrhoidectomy. Milligan and Morgan described conventional open hemorrhoidectomy in 1937 and Ferguson in 1959 described closed hemorrhoidectomy. Owing to low expense and technical ease open hemorrhoidectomy is the procedure of choice, even though newer modalities have come in to play.

Closed hemorrhoidectomy by Fergusons has got considerable attention in some parts of the world because of low post operative pain as presumed due to closure of cut edges of mucosa, faster wound healing and good patient compliance. However randomized control trials comparing the above two procedure has been contradictory to assumptions. This study compares the of outcome open vs. closed hemorrhoidectomy with set parameters.

Aims and Objectives of the study

To compare the outcomes following hemorrhoidectomy by the Milligan-Morgan's open and Ferguson's closed technique.

The variables that are being compared are:

a) Post-operative pain,

b) Complications,

c) Length of hospital stay,

d) Wound healing.

REVIEW OF LITERATURE

History of management of haemorrhoidal diseases

Haemorrhoids seem to be the oldest ills known to man. Morgagni in 1749 postulated it to man assuming upright position. In 1700 BC Edwin smith papyrus, the Egyptians appeared to have infused alum as astringent for anal disorders. Anal diseases have been coded in Hammurabi in Babylon in 2250 BC and in papyrus in 1500 BC. Hippocrates in 400 BC recommended cautery and simple excision. Ancient Greeks practiced anal dilatation. Celsus in de medicina referred to ligature with flax thread. Galen too advised surgery by double knotting. Susruta samhita the Ancient Hindu Sanskrit text describes method of clamp and cautery.

Lorenz heister in his work of chirurgie 1739 advised ligation with needle and thread. In 1774 jean Louis petit devised sub epithelial haemorrhoidectomy. Samuel cooper in 1809 took the idea of petit and described sub mucosal haemorrhoidectomy.

Verneuil in 1855 hypothesized straining at stools as cause for haemorrhoids which was studied through anatomical advances. Ireland appears to be the centre for conservative management of haemorrhoids as practiced by Houston in 1843 using nitric acid. Mitchell 1903 pioneered the injection of 30 % phenol in olive oil.

Concept of anal sphincter spasm came to existence in 19 th century Copelan in 1814, fecanier in 1829 nad maisonneuve in 1864 described anal dilatation through there own methods. Division of sphincter was mentioned by boyer in 1818 and dupuytren in 1833. Total pile excision with suturing was devised by whitehead in 1882 which was later abandoned due to complications but now the concept has been taken in to endostapling technique.

Allingham and allingham in 1901 from st marks hospital Britain reported a series of cases of haemorrhoidectomy by salmons method .

During early twentieth century various literatures on operations of haemorrhoids came from surgeons. These include miles 1919 v shaped excision of pile with skin tag. Later Milligan and Morgan open haemorrhoidectomy came to practice. Closed haemorrhoidectomy stemmed from sub mucosal technique and was described by Fergusons in 1959. Anderson in 1909 and cormie and McNair in 1959 revived clamp and cautery method.

Fixation by sub mucosal injection practiced by Blanchard and alright in 1928 using 5 % phenol injection. Next method of rubber band fixation developed by blaisdell in 1954. This technique was later perfected by Barron in 1963.cryotherapy was applied by Fraser and gills in 1967 for management of haemorrhoids. Infrared photocoagulation a recent addition by nath et al in 1977 was popularized by Neiger and Bern.

Anatomy of anal canal

Developmental anatomy

Proximal part of anal canal develops form the hindgut but the distal part of anal canal develops from the anal pit. So the proximal part of anal canal is endodermal in origin but the distal part is ectodermal in origin as evident from the epithelial lining of the canal. Perineal body develops from fusion of anal and cloacal membranes. On either side of the canal anal tubercles are formed by the somatic mesoderm which results in the formation of anal sphincters.

Surgical anatomy

Anal canal measures roughly about 2.5 to 5 cm in length[1,2]. It extends from the anorectal junction to the anal verge. Anorectal junction is marked by indention of puborectalis sling which provides an anorectal angle required for maintaining continence. Anal verge is identified by the puckering and pigmentation of the anal skin. Anal canal consists of epithelium, sub epithelial vascular tissue and sphincter along with fibro muscular supporting structures.

Anal canal is attached to coccyx by a ligament above which lies median raphae for fusion of levator ani between these structures lies the post anal space.

Surgical anal canal differs from anatomical and histological anal canal. Surgical anal canal starts at anorectal junction as described above

but histological anal canal is said to extend from the tip of anal columns and anatomical canal starts from dentate line.

Anal orifice is an oval slit in anterioposterior plane at rest. Anteriorly anal canal is separated from the surrounding structures by perineal body.

Lining of anal canal

Anal canal is divided into upper , middle and lower anal canal based on the lining epithelium of the canal[3]. Upper and middle anal canal measures roughly 1.5 cm and lower anal canal measures 8mm.

Upper anal canal

Upper third of canal is lined by columnar epithelium containing secretory and absorptive cells along with crypts or tubular glands. Sub epithelial tissue i loose due to presence of vascular plexuses supplied by superior rectal artery and these veins form plexuses and drain in through inter muscular plexuses in to the portal circulation.

There are 6 – 10 vertical folds of mucosa found in the anal canal which are termed as anal columns of morgagni. These columns have a twig of superior rectal artery. Anal cushions as described at fixed position corresponding to 7 , 11, 3 clock position are prominent anal columns.

At the end of the column there are cresentric folds called valves. Between the anal valves there are opening for anal sinuses. Together these anal valves and sinuses form the dentate line.

At the anal valves the anal glands open, these glands[4] are linear branched one extending up to external anal sphincter.

Middle anal canal

Middle third of canal which is below the dentate line is lined by non keratinized squamous epithelium devoid of appendages till the inter sphincteric groove. Middle anal canal is also called as pectin and the sub epithelium is composed of venous plexus. This part of anal canal is supplied by peripheral nervous system and hence sensible to pain. Lower limit of pectin is formed by white line of Hilton.

Lower anal canal

Lower anal canal is lined by keratinized squamous epithelium and they have appendages.

Anal transitional zone

Transition from columnar to squamous epithelium starts above dentate line and extend for variable length. They contain thermoreceptors. These are necessary for sampling mechanism.[5]

Muscles of anal canal

Anal canal is surrounded by internal and external anal sphincter . They are separated by longitudinal muscle . These are attached to puborectalis and transverse perinea muscle above.

Internal anal sphincter

Internal sphincter is circular obliquely placed smooth muscle extending from rectum. Internal sphincter is 1.5 to 3.5 mm in thickness depending up on the region and gender of the anal canal. Internal sphincter extends up to the junction of superficial and subcutaneous part of external sphincter. At the lower end internal anal sphincter is divided by septa extending from longitudinal muscle layer.

Arterial supply is from the superior and inferior rectal arteries.

Nerve supply of internal anal sphincter

Sympathetic – lower two lumbar segments via inferior hypogastric plexus.

Parasympathetic is from 2 to 4 sacral segments via inferior hypogastric plexus.

Reflexes exist between internal sphincter and lower rectum , between pelvic floor and internal sphincter through somatic nerve.

External anal sphincter

External anal sphincter is an oval tube of striated slow twitching muscle fiber with ability to maintain sustained contraction. They are divided in to superficial, deep and subcutaneous part though they function as one unit.[6] Superiorly it is attached to puborectalis, transverse perinea and anococcygeal raphae. Inferiorly it is attached to coccyx via anococcygeal ligament and perineal body

Arterial supply is by inferior rectal artery and medial sacral artery.

Nerve supply is by pudendal nerve.

Fibro muscular septa

Longitudinal fibro muscular structure is located in intersphincteric space. It is formed by the fusion of striated and smooth muscle. Striated muscle is derived from puborectalis and puboanalis. Smooth muscle is derived from longitudinal muscle of the rectum.[7]

It Is A Fusion Of Muscle And Fibro Elastic Structure. At The Lower End Of The Longitudinal Muscle It Divides In To Several Septa To Get Attached To The Perianal Skin.

The Medial Most Part Of The Septa Is Attaches To The Anal Lining Marking The Inter Sphincteric Groove. The Lateral Most Septa Attaches To The Perianal Skin In Ischioanal Space.

Sub mucosa Of Lower Anal Canal Have Fibro muscular Septa Which Originate From The Longitudinal Muscle Coat Attaches To The Anal Verge In Honey Combing Fashion Which Prevents Even Mild Distension Of Perianal Skin. This Explains The Intense Pain Associated With External Haemorrhoids.

Anorectal Spaces

Perianal Space

Perianal Space Is In Immediate Vicinity Of The Anal Verge Surrounding The Anal Canal. It Is Continuous With The Intersphincteric Space. Perianal Space Contains External Haemorrhoidal Plexus, Inferior Rectal Vessels and Lymphatics.Laterally Extends In To Subcutaneous Fat of Buttocks And Medially Extends Up To Dentate Line.

Ischioanal Space

Pyramidal Space Bounded By Levator Ani in the Apex, Inferiorly Bound By Skin.

Anteriorly Bound By Superficial And Deep Transverse Perineal Muscle And Posterior Perineal Membrane, Posteriorly Bound By Gluteal Skin. Medial Wall Formed By Levator Ani and External Anal Sphincter. Lateral Wall Formed By Obturator Fascia with Obturator Internus Muscle and Ischium.[8, 9, 10]

Contents Of Ischioanal Space Is Inferior Rectal Nerve And Vessels Along With Transverse Perineal Vessels And Perineal Branch Of Fourth Sacral Nerve.

Intersphincteric Space

It Lies Between the Two Sphincter Muscles and Is Continous Below With Perianal Space.

Supralevator Space

It is Bounded By Peritoneum Superiorly, Laterally By Pelvic Wall, Medially By Rectum And Inferiorly By Levator Ani Muscle. It Is Situated On Either Side Of Rectum.

Sub mucous Space

Lies Below The Mucosa And Extends Distally To Dentate Line . Proximally Continuous With The Submucous Space Of Rectum. It Contains The Haemorrhoidal Plexus.

Superficial Postanal Space

Connects the Perianal Space With Each Other Posteriorly

Deep Perianal Space

Retrosphincteric Space Of Courtney Connects Ischioanal Spaces Posteriorly.

Retro Rectal Space

Retro rectal Space Lies between Upper Two Third of Rectum and and Sacrum above Retro rectal Fascia.

Superiorly It Extends In To Retro peritoneum And Inferiorly It Is Limited by the Retro sacral Fascia. Contents Include The Loose Connective Tissue. It Is Limited Anteriorly By Fascia Propia Covering Rectum, Posteriorly By Presacral Fascia And Laterally By Lateral Ligaments Of Rectum.

Arterial Supply

Superior Rectal Artery

Superior Rectal Artery Is Continuation Of Inferior Mesenteric Artery After It Crosses The Left Internal Iliac Vessels Near The Base Of Sigmoid Colon.

Superior Rectal Artery Starts At the Last Branch of Sigmoid Artery. It Is Located Posterior to the Right of Sigmoid Colon in Close Contact with the Recto sigmoid Junction.[11]

Branches from Superior Rectal Arteries Are As Follows:

1. Recto sigmoid Branch
2. Upper Rectal Branch
3. Left And Right Terminal Branches

Terminal Branches Extends Downward Around The Rectum. The Upper Rectal Branch Has Extramural Anastomosis with Terminal Branches and Recto sigmoid Branches.

Middle Rectal Arteries

Middle Rectal Artery Supplying the Lower Third of Anal Canal Has One of the Three Origins Mentioned Below[12]

1. Internal Pudendal Artery 67 %
2. Inferior Gluteal Artery 17 %
3. Internal Iliac Artery 17%

Inferior Rectal Artery

Inferior Rectal Artery Is a Branch of Pudendal Artery Which In turn Arises From the Iliac Artery. It Arise In Alocks Canal And Traverses The Ischioanal Space To Supply The External Anal Sphincter And The Anal Canal. Arteriographic Studies Show Abundant Anastomosis Between The Inferior , Meddle And Superior Rectal Arteries At A Deeper Planes In The Walls Of The Anal Canal And The Rectum.

Venous System

Blood Returns From Anal Canal via Two Systems Portal And Systemic. The Superior Rectal Vain Drains the Upper Anal Canal, Where The Internal Haemorrhoidal Plexus Is Situated In To The Portal System Via Inferior Mesenteric Vein.[13]

Middle Rectal Vein Drains In To Systemic Circulation via Internal Iliac Vein. Inferior Rectal Vein Drains The Site Where External Haemorrhoidal Plexus Is Situated, To the Systemic Circulation Via The Internal Iliac Vein. There Is Free Communication Between Main Veins Of The Anal Canal. There Is No Relation Between Occurrence Of Haemorrhoids And Portal Hypertension.

Lymphatic Drainage

Lymphatic's From Anal Canal above Dentate Line Drain into Inferior Mesenteric Nodes via Superior Rectal Lymphatic's. Lymph Also Drains Via Middle and Inferior Rectal Lymphatics In To Internal Iliac Nodes. Below Dentate Line Lymph Drains into Inguinal Nodes.

Innervations

Anal Canal Above Dentate Line Is Supplied By Sympathetic System And Parasympathetic Via Inferior Hypogastric Plexus , Pain Sensation Is Carried By Both, Internal Sphincter Is Supplied By The Nerves. Below Dentate Line Anal Canal Is Supplied By Somatic Nerve The Pudendal Nerve From Inferior Rectal Nerve Which Also Supplies The External Anal Sphincter.(14)

Physiology of anorectal canal

Anorectal physiology is understood by studying the dynamics through following

Physiological tests

1. Anorectal manometry
2. defecography
3. Electromyography of pelvic floor muscle and sphincters
4. Nerve stimulation tests
5. Continence tests

Combination of proctograhy with presuure and electromyography provides a dynamic understanding of the physiology of anorectal canal.

Mechanism of anal continence

Anal continenece is a complex and highly intergrated process where in both the conscious will and local reflexes come into play.

The following are factors responsible for anal continence;

1. Stool volume and consistency

Stool volume and consistency is one of the important physical factors for Anal continence. Based on the consistency and volume of the stool its transit time in colon varies which has poor reservoir function for liquids thus influencing the anal continence. This is an important factor to be noted in patients complaining to anal incontinence (15)

2. Reservoir function

Reservoir function of the distal large bowel is due to lateral angulations of sigmoid Colon and valves of houston in the rectum. This

gives a mechanical barrier to the progression of stools. Difference in electrical activity between rectum and sigmoid delays the progression of stools from the sigmoid colon. Reservoir function of rectum is due to following factors (16)

- adaptive compliance of the rectum
- pressure difference between anal canal and rectum with resultant force vector towards rectum
- anorectal angulation maintained by tonic activity of the puborectalis.

3. Sphincteric factors

Anal canal is a high pressure zone due to sphincteric factor.

Internal sphincter

Anal basal pressure is contributed by the following;

30% by external anal sphincter

45% by the internal anal sphincter nerve induced

10% by the internal anal sphincter myogenic

15% by the anal cushions (17-21)

So the internal anal sphincters contributes most to the anal basal pressure.

External sphincter

Only striated muscle to be tonically active at rest is the external anal sphincter. Although activity is continually present its basal tone varies up on the posture. Even at the loss of nerve supply it gains tonic activity and does not degenerate.(22)

Infant and elderly people the external sphincter is made up of type 2 fibers which exhibits reflex continence. But in adults it is made up of type 1 fibers.

4. Sensory components

Rectal sensory perception

Rectal sensory perception is mediated by the extrinsic afferent neuron. Mechanoreceptors are present in the rectal wall which are sensitive to the mechanical deformability stretch and tension. The receptors monitor the filling and contractile state of the rectum. Superficial receptors are involved in slow ramp distension and the deep receptors are involve in rapid phase distension. Mechareceptors once activated medicate the reflexes through both intrinsic and extrinsic pathways which play a key role in defecation. (23)

Anal sensory perception

Precise perception of contents of anal canal is mediated by the sensory receptors in the canal. Histological studies have demonstrated free and organized nerve ending in anal canal.(24)

The following are the sensory receptors identified

Nerve endings that denote

a. Pain (free intraepithelial),
b. Touch (meissner's corpuscles),
c. Cold (bulbs of krause),
d. Pressure or tension (pacini corpuscles,golgi-mazzoni corpuscles),
e. Friction (genitalcorpuscles).

Though the sensory receptors role in continence has been controversial , recent studies on temperature sensation in anal canal has supported the concept of sampling response . This reinforces the role of sensory receptors in anal continence.

5. NEURAL pathways

Sympathetic nervous system has dual effect on the sphincters. It arises from the Fifth lumbar segments and mediate contractions through activity a-adrenoreceptors, whereas the b-adrenoreceptors mediate relaxation. Parasympathetic nervous system is inhibitory to the sphincter causing relaxation, emerges from the second, Third, and fourth sacral spinal segments .(25)

6. Reflexes

Reflex response of both the sphincters are important for maintenance ofanal continence .classic anal reflex is mediated by pudendal

nerve which is elicited by pricking the perianal skin results in skin dimpling. (26)

Rectal distension causes transient internal anal sphincter relaxation and contraction of external sphincter. This transient internal sphincter relaxation allows contents of the rectum to come down to the anal canal , resulting in sampling response that differentiated the consistency of the stools whether solid, liquid or gas. Contraction of external sphincter gains rime for the impulse to reach the conscious awareness and extended contraction allows time for adaptive compliance of the colon where the stretch receptors get deactivated. And the desire for urgency disappears.

Further rectal distension results in relaxation of external sphincter resulting in defecation.

This relaxation of sphincter up on rectal distension is mediate by the intramural neural anastomosis between rectum and anal canal for which nitric oxide seems to be the major neurotransmitter.

Rectal motor activity is associated with high anal pressure this temporal relationship is an important mechanism for preservation of anal continence.

7. Mechanical factors

Angulation between rectum and anal canal

Tonic activity of the puborectalis muscle maintains the angle of 90 degrees at the anorectal junction this is an important component of anal continence.

Flutter valve

It has been postulated that increased intraabdominal pressure is transmitted laterally to the side walls of the anal canal at the ano rectal junction forming the flutter valve. But it has been controversial because the high pressure is at the middle of anal canal rather than the upper third of anal canal.(27)

Flap valve

Parks Et Al Hypothesized This Flap Valve Theory . They Stated That When Increased Intraabdominal Pressure Is Transmitted To The Anorectal Angle , Forces The Rectum To Lie On The Upper Anal Canal Resulting In Flap Valve.

Studies Have Questioned Its Existence And It Remains Controversial.(28)

8. Corpus Cavernosum Of Anus

Subcutaneous And Submucosal Part Of The Anal Canal Contains A Rich Network Of Vascular Plexus Along With Smooth Muscle Fibers

And Elastic Connective Tissues Known As Corpus Cavernosum Of Anus. (29)

These Vascular Cushions Have The Ability To Expand And Contract Which Maintains Finest Degree Of Anal Continence. This Can Be Understood From The Fact That Patients Who Have Undergone Haemorrhoidectomy Have Some Alterations In Continence.

Haemorrhoids

Haemorrhoids Are The Most Common Ailments Of Mankind. Haemorrhoids Are Derived From Greek Which Means Flowing Of Blood, Haem Stands For Blood And Rhoos For Flowing.

The Following Are The Terminology Used In Various Language For Haemorrhoids;

- Pile Is Derived From Latin Which Means Ball Or Pill.
- Profluvio Di Sangue As Written By Galen, Italian Terminology.
- In Ancient French It Is Referred As Flux D Or (Flow Of Gold)
- In Ancient Germans Referred It As Golden Ader

Haemorrhoids Refer To Pathological Presentation Of Anal Cushions.

Anal Cushions Are Normal Structure Located In The Ano Rectal Canal. They Are Composed Of Blood Vessels, Smooth Muscle And Elastic Connective Tissue In The Sub Mucosa. Three Cushions Lie In The Following Constant Sites. Right Anterolateral, Left Lateral And Right Poster Lateral. Owing To Their Rich Vascular Supply, Sensitive Location, And Engorgement Tendency And Prolapse, Hemorrhoidal Venous Cushions Are One Of The Commonest Anal Pathology.

Etiology And Pathophysiology

Cause Of Haemorrhoids Remains Elusive Despite Several Theories Being Proposed.

Varicose Vein Theory

Dilatation Of Internal Rectal Venous Plexus As Result From Pathological Change Has Been Shown To Be Invalid. The Fact That Persons With Portal Hypertension Have No Variation In Incidence Of Haemorrhoids Is And Additional Evidence Against Varicose Veins Theory. Anal Varices Occurring In Patients With Portal Hypertension Are Quite Different From Haemorrhoids In Terms Of Both The Appearance And Management. Varicose Veins Theory Fails To Account For Haemorrhoids Presenting In A Single Anal Cushion. Most Common Location Is Tight Posterior.

Vascular Hyperplasia Theory

Vascular Hyperplasia Theory Has Also Been Obsolete. The Hypothesis That Haemorrhoids Occurs Due To Congestion And Hyperplasia Of Anal Cushions Has Been Disproved By Histological Studies.

Sliding Mucosa Theory

This Theory Proposes That Internal Haemorrhoids Arises Due To Degeneration Of Smooth Muscle In The Microstructure Of Anal Cushion Known As Trietzs Muscle , It Is Fibro Muscular Scaffolding Supporting The Cushions. Anal Cushions Prolapse And Engorge Due To Pressure From Anal Canal And Interruption Of Venous Return Observations To Support The Sliding Mucosa(29,30,31) Theory:

1. Anal Cushions Are Present In Both Normal Individual And Fetus. These Cushions Are Similar In Structure When Compared To Symptomatic Patients With Hemorrhoids.
2. Excisional Specimen Shows Smooth Muscles.
3. Degenration Of Smooth Muscle Occurs In Persons Having Poor Fiber Diet And Straining At Stools.
4. An Inherited Connective Tissue Weakness Explains Genetic Predisposition And Association Of Haemorrhoids With Genital Prolapse And Hernia.

5. Fragmentation Of Supportive Scaffold Of Anal Cushions In Aging Population Correlates With Increase In Haemorrhoidal Symptoms

6. Mucosal Fixation Procedure Stems From The Above Theory. Injection Sclerotherapy, Stapled Haemorrhoidopexy Utilizes The Advantage Of Fixing The Mucosa To Underlying Anal Wall, Thus Restoring The Function Of Trietz Muscle. The Rationale For Stapled Hemorrhoidopexy Fits Well With The Sliding Mucosa Theory, As It Aims To Restore The Prolapsed “Hemorrhoids” To Their Original Anatomical Position.

Internal Sphincter Dysfunction Theory

Patients With Haemorrhoids Have Increased Internal Sphincter Activity And Ultraslow Anal Pressure Wave. Anorectal Ambulatory Physiology Has Shown Increased Sampling Response In Patients With Haemorrhoids Possibly An Attempt To Expel The Irritating Haemorrhoidal Plexus. Increased Internal Sphincter Activity Creates Further Venous Obstruction And Pain During Defecation. These Findings Seem To Point Internal Sphincter Dysrhythmia As A Cause Of Hemorrhoids. But Direct Pressures Studies By Inserting Needle In To Haemorrhoidal Plexus Have Shown Increased Pressure In The Vessels Possibly Indicating Vascular Origin. And Decrease In Anal Pressures In Haemorrhoidectomy Patient’s Points Toward The Fact That Internal

Sphincter Dysfunction Is Secondary Phenomenon In Presence Of Hemorrhoids Rather Than A Cause.

Predisposing And Associated Factors

Heredity

Anatomical Features

Nutrition

Occupation

Senility

Endocrine Changes

Food And Drugs

Pregnancy

Exercise

Obesity- It Is Because Of The Pressure Due To Heavy Weight.

Sedentary Lifestyle- Immobility Can Lead To Constipation Which Can cause Increased Abdominal Pressure During Bowel Movement.

Constipation- Straining During Chronic Constipation Can Cause Internal Hemorrhoids To Bulge.

Chronic Diarrhea- Repeated Pressure And Straining Can Irritate The Lining of the Anus.

Poor Bathroom Habits- Overly Aggressive Wiping Of The Anus Canworsen Hemorrhoids.

Postponing Bowel Movement- Re-Absorption Of Water In The Coloncan Lead To Constipation And Possible Fecal Impaction.

Intake Of Fiber-Deprived Diet- No Bulk In The Food Can Lead To Constipation.

Cirrhosis Of The Liver- It Can Cause Pooling Of Blood In The Vessels Around The Rectum.

CLASSIFICATION OF HAEMORRHOIDS

Classification Of Hemorrhoids Is Necessary Not Just To Choose Between Treatments But For The Comparision Of Outcomes Between Different Therapies. Based On The Degree Of Prolapsed And Its Location It Has Been Classified. Haemorrhoids Originating Above The Dentate Line Is Know As Internal Haemorrhoids And They Are Covered By Mucosa. Those Originating Below The Detate Line Are Called As External Hemorroids covered By Squamous Epithelium. Sometime A Patient May Present With Both Internal And External Haemorrhoids Which Are Termed As Mixed Interno-External Hemorrhoids. For Practical Purposes.

The Following Golighers Classification Of Internal Hemorrhoids Is Being Used:

(1) Grade I: BLEDDING CUSHIONS WITH OUT PROLAPSE

(2) Grade II: The Anal Cushions Gets Prolapsed On Straining Through Anus But Reduces

(3) Grade III: PROLAPSED CUSHIONS THAT ARE REPLACED MANUALLY

(4) Grade IV: Prolapsed Cushion And Are Irreducible. Also Include Thrombosed And Incarcerated Internal Hemorrhoids Even Those Involving The Circumferential Rectal Mucosal Proplapse.

Hemorrhoids Are Also Classified As Primary And Secondary. Primary Hemorrhoids Are Those Occurring In 3 7 11 Clock Positions Above Dentate Line And Secondary Hemorrhoids Are Those That Occur In Between The Primary Anal Cushion Location. Included In The Above Classification Is The Prolapsed And Non Prolapsed One. But It Is Not A Widespread Classification .

Disadvantage Of Golighers Classification Is Exclusion Of Skin Tags Which Can Become Sypmtomatic and Present As Swelling ,Chronic Inflammation Lead To Fibrosis Of The Skin Tag That Cannot Be Reduced Because Of Absences Of Mucosal Component.

Table 1. Major classification schemes proposed in the literature.

	Goligher[2]	Lunnis[38]	Morgado[39]	Thomson[24]
Grade 0	-	Non prolapsing anal cushions	-	-
Grade I	Merely project into the lumen of the anal canal	Non prolapsing small haemorr-hoids	Bleeding haemorrhoid disease	Bleeding
Grade II	Piles may ap-pear externally whilst the patient is straining but return sponta-neously	Prolapsing intermediate haemorrhoids Prolapse but return sponta-neously. Bleed frequently	Prolapsing haemorrhoid disease	Prolapse at defecation (with or without bleeding) with spontaneous return to anal canal
Grade III	Protrude during defecation, re-main prolapsed until they are digitally replaced within the anus	Large haemorr-hoids that pro-lapse and need aid to reduce. Bleed frequently and often pro-fusely	Thrombotic haemorrhoid disease	Prolapse (with or without blee-ding) requiring replacement.
Grade IV	Skin-covered components cannot be pro-perly returned to the anal canal.	Very large haemorrhoids. Prolapse, which is permanent and irreducible. Bleed profusely.	Mixed haemorrhoid disease	-

Epidemology

The Age Distribution Of Hemorrhoids Demonstrated A Hyperbolic Pattern, With A Peak Between Age 45 And 65 Years And A Subsequent Decline After Age 65 Years. The Presence Of Hemorrhoids In Patients Younger Than 20 Years Old Dwas Unusual . Hemorrhoidectomies Are Performed 1.3 Times More Commonly In Males Than In Females. Most Hemorrhoidectomies Are Performed In Patients 45–64 Years Old.

Clinical Presentation

Patients with hemorrhoidal pathology have varying degrees of presentation from bleeding to sweeling, pain, discharge, pruritus. individuals with large cushions have more prolapsed component and present with more troublesome picture.

But younger individual who have tight anus have severe discomfort and bleeding show minimal abnormality on examination on contrary elderly with large cushions have no symptoms at all.

Most Common Symptom Reported In Literature Is Bleeding Besides Prolapsed. Symptoms Of Hemorrhoids Seems To Weekly Correlate With The Degree Of Prolapsed But They Vary Over Time With Regard To Bleeding.

Anal Pain

Uncomplicated hemorrhoids are not painful. Pain In Hemorrhoids Is Caused By Thrombosis , Ulceration, Gangrene Of Hemorrhoids Following Prolapse. Pain Is Present In About A Half Of Patient With Hemorrhoids And It Is Related To The Prolapsed And Gets Relieved On Manual Reduction of Prolapsed Hemorrhoids.

So patients with severe pain in absence of external component should suggest other anorectal stigmata like fissure, abscess.

Bleeding

Most Common Symptom Of Hemorrhoids Is bleeding. It Occurs During Or After Defecation And Gets Excacerbated On Straining. Blood Is Seen As Stains In Tissue Paper Or Toilet Bowl. Prolapse Cushion Id Not Reduced Will Have Impaired Venous Return With Resultant Venous Stasis And Erosion Of Epithelium During Defecation Results In Bleeding. Anemia Rarely Occurs In Patients With Hemorrhoids. If Patient Has Anemia And Is Aged Above 50 Yrs Then Thorough GI Investigation should Be Done To Exclude Other Causes.

Soiling

Prolapsed Of Anal Cushions Disrupts The Normal Closure Of The Anal Canal. This Results In Mucus Soiling. There Is Difference Between Soiling In Hemorrhoids And Fecal Soiling Due To Lax Sphincter. The Soiling occurs Between Defecation And During Daily Activities.

Pruritus

Irritation of Perianal Skin Resulata From Chronic Exposure To Moisture Of Mucus Discharge From The Prolapsed Cushion Resulting In Anal Pruritus. Anal Priritus Can Also Be Idiopathic .

Prolapse

Descend Of Anal Cushions Occur Due To Fragmentation Of Connective Tissure That Supports It. Prolapse May Reduce Spontaneously

Or Requires Manual Reduction. Prolapsed Needs Reduction Because Its Persistence Predisposes To Thrombosis And Necrosis Of Hemorrhoids. If It Is Irreducible Or An External Component Is Present It Requires Excision. Either A Single Cushion Of Circumferential Mucosa Can Prolapse.

Anal Incontinence

Patients With Hemorrhoids Have Symptoms Of Fecal Incontinence Due To Prolapsed Hemorrhoids Because The Anal Cushions Have Become Defective And There Is No Proper Closure Of Anal Canal. Even Patients After Hemorrhoidectomy Present With Incontinence As The Function Of Normal Anal Cushion Has Been Compromised Is Their Absence.

Differential Diagnosis Of Hemorrhoids

Thrombosed External Hemorrhoids
Fistula In Ano
Anal Fissure
Hypertrophied Anal Papilla
Perianal Abscess
Rectal Prolapse
Condyloma Acuminate
Skin Tags
Polyp
Perianal Crohns Diseases
Anorectal Carcinoma
Melanoma

EXAMINATION

History

From a very clear and careful history taking a definitive diagnosis can be arrived based on the symptoms such as pain, bleeding and discomfort. Especially there relationship to defecation increases the likelihood of the diagnosis. Imperative need for endoscopic examination can not be excluded as it is required to rule out other potential life threatening causes for rectal bleeding.

Inspection

Proper inspection is carried out either in jack knife position or sims position.

Parting the gluteus fold will reveal the presence of discharge in perianal region which occurs in 3 rd degree hemorrhoids. It is important to differentiate between rectal prolapsed and cushion prolapsed. As their managements differ. Proper inspection with palpation is necessary to differentiate hemorrhoids from other disorders in that region.

Palpation

After inspection it is palpation that is necessary. As it is required to exclude other causes of anal region. Hemorrhoids unless thrombosed are not painful and also not palpable. Palpation should be gentle with sufficient lubricant.

Endoscopy

Proctoscopy

Proctoscopy will demonstrate presence of pathological cushions along the bleeding. It is imperative to rule out other causes of bleeding before diagnosing hemorrhoids as the cause. Even presence of pathological cushions does not mean that it is the cause of bleeding.

Sigmoidoscopy

If there is any doubt in the diagnosis complete colonic examination should be carried out. Patients above 50 yrs with high suspicion for cancer should undergo colonoscopy . it is better to use flexible sigmoidoscopy to prevent iatrogenic bleeding.

Complications Of Hemorrhoids

Haemorrhage
Strangulation
Gangrene
Fibrosis
Suppuration
Pyelephebitis (Portal Pyemia)

Management Of Hemorrhoids

Management Of Internal Symptomatic Hemorrhoids Varies From Simple Reassurance To Operative Hemorrhoidectomy. Treatment Options Are Categorized In To

1. Dietary And Life Style Modifications
2. Nonoperative /Ambulatory Procedures
3. Operative Hemorrhoidectomy.

Generally Less Symptomatic Patients Are Managed With Dietary Modifications , Change Of Defecation Habits, Or Ambulatory Procedures. More Symptomatic Patients Are Managed With Operative Intervention.

Suggested Plan Of Management

S. No	Condition	Treatment
1.	Grade 1 Hemorrhoids	Exclusion Of Other Causes Of Bleeding, Diet, Psyllium Seed, Or Bran, Rubber Band Ligation Electrocoagulation
2.	Grade 2 Hemorrhoids	Rubber Band Ligation Electrocoagulation
3.	Grade 3 Hemorrhoids	Rubber Band Ligation Electrocoagulation Closed Hemorrhoidectomy Stapled Hemorrhoidopexy
4.	Grade 4 Hemorrhoids	Rubber Band Ligation Closed Hemorrhoidectomy Stapled Hemorrhoidopexy
5.	Prolapsed Strangulated Hemorrhoids	Emergency Closed Hemorrhoidectomy Rubber Band Ligation Stapled Hemorrhoidopexy
6.	Thrombosed External Hemorrhoids	If Painful, Excision Of Clots With Patient Under Local Or General Anesthesia Perianal Skin Tags If Symptomatic , Excision With Patient

7. Hypertrophied Papillae Excision
   Symptomatic

Conservative management

Medical management

Advice

Advice is best suited for those with minor symptoms having incorrect diet and improper defecation habits. It best to start with perianal lavage along with high fiber diet and omitting diarrhoeagenic foods for patients recently diagnosed with pathological cushions. Those having contraindications to any ambulatory or surgical procedure should follow conservative line of management.

Changing defecation habits

There are three most prevalent defecation errors prevalent among the patients with hemorrhoids

1. Insistence to pass stools atleast once daily
2. Neglect the first urge to defecate
3. Insistence to pass stools in large portions

   Thorough history should be elicited and advice should be given regarding unwise defecation habits .

Diet manipulation

Pharmaceutical fiber agents

1. Ispaghula husk
2. Psyllium seed extracts

3. Methyl cellulose
4. Sterculia

Logical first line therapy is diet manipulation and adding bulking agents.

Simplest way to achieve bulky stools is to add high fiber diet . failure to adhere diet plan necessitates pharmaceutical fiber agents.(32,33,34)

Reducing The Straining at stools is the primary goal in diet manipulation as prolonged defecation attempt has been associated with development of pathological cushions

Medical Therapy

Vasotopic drugs

Following are some of the drugs in market

1. Hydroxyethylrutosides
2. Calcium dobesilate
3. Micronized purified flavonodic fraction known as daflon

Oral administration of these drugs has been suggested in treating venous ulcer and oedema. Calcium dobesilate has been been suggested to reduce blood viscosity. Daflon has been suggested to work through strengthening of vein wall by prolonging the duration of action of epinephrine. Evidence do not support there use.

Topical treatment with sitz bath by immersing the perineum in warm water at 40 c has resulted in reduced anal pressure and decrease in oedema of the anal canal along with reduction in symptom of anorectal diseases.

Various topical creams and lotion are available. Topical agents contain anaesthetic drug or steroids and analgesics.

Preparation H is being implicating in causing reduction in oedema of perianal region. Studies show that it contains skin respirator factor that causes early wound healing when compared to placebo

Invasive Therapy principles

History Of Treatment Of Hemorrhoids Parallels Development Of Three Broad Methods Of Invasive Treatment, Each One Related To A Hypothesis About The Causes Of Symptoms

1. Prevention Of Prolapsed By Fixation
2. Prevention Of Congestion Or Impedence On Venous Return By Stretching Of Internal Sphincter
3. Excision Of Engorged Internal Cushions

Ambulatory Procedures

Sclerotherapy

Sclerotherapy causes mucosal fixation by creating a aspectic inflammation.

Using 23 guage syringe the submucosal layer is entered and sclerosant agents are injected .(34)

Following are some of the sclerosant agents available

1. 5 % phenol in almond oil
2. urea
3. quinine
4. hypertonic saline solution

Technique; an oblique ended proctoscopy is passed in the anal canal and the inspection of lower end of the canal is done. Once the mucosa is visible the proctoscopy is removed completely until the mucosa closes the anal canal indicating the site of the cushions.

On with drawing the proctoscopy the junction of reddish an purplish mucosa will be visible. this is the base at the cushion. Its approximate distance from the pectin line is noted. The proctoscpy is position as to treat the 8 clock hemorrhoids first. The syringe containing sclerosant Is taken introduced obliquely through mucosa for a distance of 1 cm above the dentate line.

A very small quantity of sclerosant roughly 3-5ml is injected in to the cushion. Any inadvertent injection in to mucosa that is more superficially will cause mucosal sloughing and ulceration. Any deep injection could damage the sphincter or could cause pain.

Patients undergoing this procedure usually have no pain. It the patient is experiencing any discomfort then propably the syringe is at

wrong place. As the procedure is carried out in insensate line of the anal canal it is deemed painless.

Following the treatment of 7 clock cushion other cushions are simultaneously injected. Any bleeding could necessitate pack with cotton ball or rubber band ligation.

Complications of sclerosant injection

1. Lower urinary tact sepsis
2. Local sepsis
3. Chronic prostatitis
4. Hematuria
5. Hemospermia
6. Oleogranuloma
7. Fibrosis causing stenosis of anal canal a long term complication

Rubber band ligation

Principle

It works in the same principle as sclerotherapy. It causes fixation of hemorrhoidal tissue not by inflammation but by ulceration following strangulation of the mucosa.

Equipment

Different types of instruments

1. Barron rubber o ring ligator
2. McGiveny ligator
3. Proctoscopy liagators by haroon

4. Suction ligator include mcgown and luz goltner ligator

First three instruments require an assistant to hold the grooved proctoscopy during the procedure. Suction ligator has the advantage of not requiring any assistant .but the disadvantage with suction ligator is that small tissue is strangulated . earlier band ligators had barrel on through which the grasped tissue is brought through.

Position of the patient (35-39)

No special bowel preparation is required and patient is positioned in left lateral .

Technique:

PROCTOSCOPY is passed in to the anal canal usually grooved proctoscopy are preferred . base of the cushions and he dentate line are observed. The pathological cushion is grasped and brought in to the barrel of the instrument using allis forceps. Once the position has been checked the band is applied at the neck of the anal cushion. Although there are no sensory innervations in the upper anal canal robber band ligated with in a centimeter from the dentate line causes discongort. Hence it it recommended to position the band 1.5 centimeters from the line.. once the position of cushion is confirmed it is pulled through the barrel and the handel is squeezed to release the band. Usually two rubber bands are applied per cushion to strangulate the blood supply.

Multiple banding in single sitting is being recommended now provided patients tolerate the procedure .

Recently a technique of video endoscopy banding has been introduced . though it does not produce substantial benefit from the rest

Complications of band ligation

1. Pain ; This is avoided by placing the band higher up in the anal canal well away from the dentate line. Moderate degrees of discomfort are being complained by patient this generally requires analgesics and observation. Persistent pain necessitated removal of the band immediately as it could be difficult once oedema sets in. occasionally bupivacaine is injected to reduce pain.
2. Bleeding ; sometimes this could occur from the ulcer bed as the tissue sloughs of from the granulation tissue.
3. Pelvic cellulitis; measures suggested to prevent such complication are to give preoperative antibiotics , rule out immunodeficiency in the patient, and meticulous technique.

Results and comparison with other procedures

Band ligation has been associated with good satisfaction among the patients and it is being recommended for grade I & II haemorrhoids. randomized controlled trial has shown that rubber band ligation is comparable similar in efficacy to sclerotherapy and photocoagulation. But it seems to be better than cryotherapy.

Cryotherapy

Cryotherapy works through freezing the tissue using liquid nitrogen or nitrous oxide . but as it is associated with problems such as pain and mucous discharge the procedure has been abandoned.(42)

Photocoagulation

Principles

Nath et al in 1977 used the concept of coagulation of proteins in treating haemorrhoids. The infer red radiations produced by tungsten halo lamp casues coagulation of tissues. This is given in pulsed manner. Infrared radiation raised the temperature of local tissue to 100 c which produces an area of coagulated protein. It works approximately at 3mm depth and 3mm width. It burnt the tissue is same way as cryotherapy. Dead tissue separates and the resulting ulcer heals by 4 weeks.(40)

Equipment

It consists of

1. 15 v wolfram halogen lamp produces radiation
2. Gold plated reflector for focus
3. Radiation passes through quartz light shaft

It has a timing piece for precise pulsed application. And the tip of the probe is covered with polymer cap,helps in prevention of adherence to tissues.

Technique

Usually left lateral of knee elbow position is preferred. The grooved proctoscopy would show the pathological cushion. The tip of the probe is firmly placed over the pile mass and pulsed radiations are automatically timed once the trigger is pulled. As the brightness of light causes lack of accommodation for operators eye. It is prudent to close the eyes momentarily. The contact of probe with the mucosa is most important as any tissue in between will be burnt. Approximately 6 pulsed irradiation are given per cushion.

Complications

1. Pain : of the ambulatory procedures photocoagulation has the least amount of pain. The cause of patients mild discomfort could be due to application of photocoagulation close to the anal verge or the dentate line.
2. Bleeding : secondary bleeding is least compared to other procedures because the damaged cause is more superficial. As the depth of penetration is 3mm and diameter of effect is just 3mm.
3. No stenosis or urinary retention has been documented

Comparison with other forms of treatments

In comparison with cryotherapy and rubber band ligation the following were noted as advantage for phtotocoagulation

a. Higher satisfaction rate
b. Fewer side effects
c. Good control of bleeding
d. Simple fast and effective mode

Thus photocoagulation is the most useful office procedure in dealing with grade I and II haemorrhoids.

Bipolar diathermy (bicap or ligasure)

Principle

Bipolar RF current causes coagulation of vessels with tissue destruction, ulceration, and fibrosis by the local application of heat. The pathway of current is short so the depth of penetration is less.(41)

Technique

Using a disposable non conductive anoscope the side probe is applied directly on the cushion. The generator is set at infinity and activated by foot switch. A white coagulum forms approximately of 3mm depth. All the cushions are treated in one session. Originally this procedure was done under local anethesia but now it is done under general anesthesia and hemorrhoidectomy is performed with help of this instrument which is popularly known as bloddless haemorrhoidectomy.

Comparison with other procedures

As effective as photocoagulation in terms ease and post operative outcome.

Direct current therapy

The technique utilizes monopolar low voltage electrical current that is applied to the haemorrhoidal tissue for over a period of ten minutes causes the tissue to coagulate and heal by fibrosis. The disadvantage of this technique is that it requires 10 minutes of application per cushion, which is substantially more than that required by other ambulatory procedures. Hence this has lost popularity but still practiced.

Operative treatment of haemorrhoidal disease

Those who fail to get symptomatically improve with ambulatory procedure for haemorrhoids are considered for operative intervention.

Indications for operative intervention include:

1. III degree haemorhhoids
2. IV degree haemorrhoids
3. Prolapsed haemorrhoids
4. Thrombosed haemorrhoids
5. Strangulated hemorrhoids
6. Haemorrhoids with external component
7. Complicated haemorrhoids
8. Haemorrhoids associated with other anorectal disorders

Operative interventions could be categorized in to few types

1. Excision of haemorrhoids – haemorrhoidectomy
2. Fixation of prolapsed tissue – haemorrhoidopexy
3. Dearterialization – haemorrhoidal arterial ligation

Named procedures in haemorrhoidectomy

1. Millian Morgan open haemorrhoidectomy
2. Fergusons closed haemorrhoidectomy
3. Submucosal haemorrhoidectomy by parks
4. White head haemorrhoidectomy

Closed Ferguson haemorrhoidectomy

In 1959 Ferguson developed this technique .the prime reason for development of this technique wast o reduce the disadvantages of open haemorrhoidectomy.(43)

Three principles objectives were placed

a. To remove as much vascular tissue possible with out sacrificing on the anoderm
b. Minimize postoperative serous discharge by prompt healing of anal canal with epithelium
c. To prevent stenosis that may complicate healing of large raw wound by granulation tissue

Indications

Almost 90 % of haemorrhoidal disease can be managed with out operation. However when operation is indicated closed haemorrhoidectomy can be used in all the patients.immediate postpartum

patients who develop complicated haemorrhoids can be managed with closed approach immediately.

Relative contraindications

Patients who have associated following conditions

a. Crohn's disease as complication rates are high
b. Portal hypertension – banding preferred if required
c. Lymphoma and leukemia- are immunocompromised and hence infection rates are high . So open haemorrhoidectomy is preferred.
d. Bleeding diathesis

Preparation

Like in any other operative haemorrhoidectomy patient should receive enema on the night before surgery and on the day of surgery at early hours. Complications should be explained to the patients. Regional, general, local anesthesia can be given.

Technique

Patient in jack knife position with two rolls of towel under the chest and two rolls under the iliac crest. patient is anesthetized and positioned as required. The gluteus is parted and after painting speculum examination with pratt bivalve speculum if available. This helps surgeon to analyze which quadrants would require haemorrhoidectomy and presence of additional pathology. Each patient is individually evaluated and excess

haemorrhoidal tissues are only excised. The aim is to preserve as much as unique skin in ala canal as possible. It is also necessary to inspect the rectal mucosa above as it may also be prolapsed along with the haemorrhoids.

Submucosal plane is infiltrated with bupivacaine with epinephrine solution to create a bloodless field. After examination fansler proctoscope is introduced it is of contant diameter so prevents excessive stretching while operating. It is positioned in fashion that the excessive haemorrhoidal tissue is positioned in the operating channel of the anoscope.the skin tag or haemorrhoidal tissue is grasped with allis forceps and using metzenbaum scissors the mucosa is incised below the instrument with curvature towards anal canal along the haemorrhoidal tissue while pressing firmly to buttress against the internal sphincter with the belly of the scissors. Most prominent region of haemorrhoidal tissue along with submucosal plexus is excised. bleeding submucosal vessels are cauterized.

Following initial excision additional vascular plexus underneath the mucosa are filleted leaving the sphincter bare. These additional vascular tissue beneath the mucosa are excised to decrease the chance of recurrence. After complete excision of the haemorrhoidal tissue the redundant cushion tissues are excised to a point above the internal sphincter . the cut ends of the mucosa are closed with absorbable catgut sutures. Apex bite is placed to include the mucosa along with submucosa and muscle to prevent mucosal prolapsed. Rest of the wound is closed with running sutures

including the external wound. After closure of the wound the anal canal is inspected to judge additional cushions requiring haemorrhoidectomy.

Skin tags if present should be excised along with this procedure. It is better to start with largest cushion and to proceed to smallest . after completing the procedures in required areas the anal canal is inspected for bleeding if present it should be controlled with figure of eight stitch.

Adjuvant sphincherotomy is not recommended.

Submucosal haemorrhoidectomy

This procedure was developed by parks . the prime aim of the technique is to excise the haemorrhoidal plexus by incising the mucosa. Submucosal plane is infiltrated with epinephrine containing anesthetic solution and inverted racket incision is made over the haemorrhoidal tissue. The handle portion of the incision is made over the rectal mucosa and the circular portion of the incision is made over the perianal region and the skin of anal canal. Mucocutaneous flaps are raised on either side paying particular attention to the mucosal suspensory ligament, starting from below to the pile mass. The pedicle is identified and ligated, flaps fall back over the raw area. The edges are approximated by absorbable sutures.

The advantage of this procedure is same as that of closed procedure.

Postoperative care

1. Intravenous fluids as required and kept minimum
2. Regular high fiber diet
3. Narcotic analgesics as required
4. Sitz bath

Open haemorrhoidectomy

In 1917 Milligan and Morgan from uk practiced open haemorrhoidectomy. Preoperative preparations are same as any other haemorrhoidectomy.

Technique

The patient is placed in lithotomy position after giving regional anesthesia, the buttocks are placed well beyond the edge of the table. The perianal region is painted and drapped. Submucosal plane is infiltrated with diluted adrenaline solution to minimize bleeding. The dermal component of haemorrhoids are seized and pulled out this exposes the mucosal component of the haemorrhoids. Depending up on its size the cushions will prolpase outside the canal. The purple anal mucosal component of the haemorrhoids are now grasped using an artery forceps. And drawn outwards this causes the pile to prolapsed well beyond the anal verge to expose the pink rectal mucosa at its upper pole.(44-46)

The cushions are grasped as stated and traction is applied on all the cushions to make the mucosal folds to come in to the picture. It indicates

that the pile mass has been exposed to maximum and so doing helps to place the transfixation suture at the apex under vision. The procedure is first done at 3 o clock position. Left hand of the operator is passed in to the anal canal and the cushion is grasped and fixed with the index finger of the left hand.

The operator then makes a v shaped incision at the mucocutaneous junction with blunt scissors. The apex of v incision points towards the anal verge. If the tip of surgeons finger presses firmly against the scissors as it dissects the lower end of the internal sphincter gets exposed thus preserving it from the injury. The instrument holding the skin component is displaced towards the lumen. The raw area of the wound is exposed. The longitudinal strands of fiber entering the venous plexus is being cut. The anal cushion is well separated from the internal sphincter. Mucosa above and below the cushion is incised to narrow the pedicle.

Transfixation done at the apex of the pedicle. The cushion is then cut leaving behind the apex with ligature in situ and raw area. The same procedure is first repeated in the 7 o clock position then the 11 o clock position. While making incision for the three cushions it should be taken care to preserve as much as possible the normal tissue bridge in between the cushion to prevent anal stenosis later on. At the end of the procedure a nice clover leaf shaped anal margin should be visible with intact skin bridges between the operated site. The anal canal is packed with guaze

impregnated with lubricant, as a hemostatic pack. If accessory piles are present it should be included in any of the three clock position.

Postoperative care is the same as for closed haemorrhoidectomy, with adequate analgesia as required.

White head haemorrhoidectomy

It is circumferential excision of the haemorrhoids along with anoderm. The skin is then sutured to the rectal mucosa. This procedure resulted in mucosal ectropion and has been abandonded. It also caused stenosis and incontinence.

The new approach of endostapling technique seems to utilize this concept.

Laser haemorrhoidectomy

Laser has been used instead of scissors to perform haemorrhoidectomy. Both ND yag and co2 lasers have been in use. The laser beam is focused on to the haemorrhoidal tissue until it is covered by a white membrane. It causes minimal damage to surrounding structures.(47)

Diathermy haemorrhoidectomy and ligasure haemorrhoidectomy

Diathermy is being used instead of the scissors in performing open haemorrhoidectomy. It is associated with good hemostasis.

Bipolar diathermy has also been used which is called as ligasure it combine both the cutting and coagulation along with minimal thermal spread instead of scissors in the open technique.

Harmonic scalpel haemorrhoidectomy

Harmonic scalpel uses low temperatures when compared to other procedures. It divides tissues using high frequency ultrasound energy which disrupts the protein hydrogen bond with in tissues. Blood vessels are coapted and sealed by the denatures protein.

Stapled haemorrhoidectomy

In 1993 longo described the endostapling technique. He used a standard circular gun stapler. His aim was to;

a. Restore the normal topography of the anal canal to improve the venous return and prevent obstruction
b. Interruption to terminal arterial branches would reduce the blood flow in to the subepithelial plexus and reduce the mucosal prolapse there by reducing the trauma caused by fecal impaction

Mucomucosal anastomosis in a insensitive area could reduce the post operative pain.(48)

Equipment

Components of the endostapling instrument is;

a. 33 mm haemorrhoidal circular stapler hcs33

b. Suture threader st100
c. Circular anal dilator cad33
d. Purse string suture anoscope psa33

Technique

After anesthetizing the patient is placed in jack knife position. Anal varge is held by three forceps and the anoderm is everted. The dilator is introduced and it causes the reduction of the prolapsed mucosa. The obturator is being removed and the cushions fall in to the lumen of the dilator. Purse string suture is taken about 5 cm from the dentate line using anoscope. Then the circular stapler is introduce and the purse string suture is brought through the stapler and care must be taken to include only the mucosa. As the mucosa is brought in to the casing of the stapler the gun is fired . and it is kept for 20 seconds to maintain hemostasis. The stapler is then removed and the stapled line is being inspected for the doughnut.

At the end of the procedure the prolapsed mucosa has been removed leaving behind the mucomucosal staple line. Which should be 2cm above the dentate line. The tissue is sent for HPE.

Comparison to other procedures

It is less painful, easier to perform and shorter hospital stay. But the dreaded complications include pelvis sepsis, stricture.

Complications following haemorrhoidectomy

1. Postoperative pain – anal spasm and raw are has been implicated
2. Urinary retention – postop pain and fluid overload has been implicated
3. Reactionary haemorrhage – ligature slippage and bleeding from raw area has been implicated
4. Secondary haemorrhage – due to sepsis
5. Anal fissure – unhealed wounds
6. Abscess
7. Fistula – due to infection
8. Formation of skin tags – oedema adjacent to the haemorrhoidectomy results in skin tag
9. Pseudopolyp and epidermal cysts – foreign body reaction
10. Incontinence- due to sphincter injury. Anal leakage and soiling are common in initial operative days which gets cured by 6 wks. Any frank incontinence though rare Is dangerous
11. Anal stenosis – scar retraction

Management of prolapsed thrombosed internal haemorrhoids

Conservative management has limited effect in relieving the symptoms. Hence now haemorrhoidectomy is advocated .the difference is that on table anal dilatation form 5 minutes reduces the oedema and the cushions are reduced there by facilitating safe haemorrhoidectomy as in elective procedures. Ther is no difference in complications between

emergency and elective haemorrhoidectomy. Only that antibiotics would be recommended.

Management of haemorrhoids in special circumstances

a. **Pregnancy:** initially conservative management is being planned. But when it gets complicated as it occurs during the post partum it can be excised.
b. **Immunocompromised:** better to follow conservative approach as infection is worrisome.
c. **Inflammatory bowel disease:** crohns disease is a contraindication to operative management.

Management of thrombosed external haemorrhoids

Patient is advice conservative management with sitz bath and analgesics.

If conservative management fails then the clot is let out under anesthesia using a radial incision.

MATERIALS AND METHODS

Source of data

Study Design

Prospective study**.**

Sample Size

60 patients who fulfill the criteria will be included in the study. The patients who fit in to the criteria will be randomized in to two groups A for open hemorrhoidectomy and group B closed hemorrhoidectomy. Simple random sampling will be utilized

Sampling Procedure

Simple random sampling will be employed.

Study Methods

The patient who have fitted in to the criteria will be given the consent form for their enrolment in to the study. Patients in group A will have open approach of hemorrhoidectomy describe by Millian Morgan. Patients in group B will have closed approach of hemorrhoidectomy described by Ferguson's.

Both the procedures will be conducted under Spinal Anesthesia.

All the patients will be administered with analgesics as per their requirements during perioperative period. Advise will be given to all patients about stool softeners , sitz bath.

At discharge patients will be given similar advice on wound care, dietary , defecation habits, and analgesic drug.

The two groups will be analyzed post-operatively on variables such as :

a) Pain: assessed by visual analog scale.

b) Wound healing time: < 3 weeks vs > 3weeks.

c) Complications: bleeding, wound infection, need for re-intervention.

d) Length of hospital stay.

All patient will assessed during the first post-operative day, day of discharge, and at follow up visits at 1st week, 3rd week, 6th week and 9th week post-operatively.

Data Collection

A. Clinical history along with patients proforma will be collected.

B. Informed written consent from the patient will be obtained

Statistical Analysis

Descriptive statistical Analysis will be carried out in the present study. Confidence interval will be 95 % . Significance is assessed at 5% level of significance.

Student t test two tailed independent will be used for continuous parametric variable

Mann Whitney u test two tailed dependent will be used for continuous non parametric variable

Chi square / fisher exact test will be used to study parameters in categorical scale.

P value <0.05 will be considered statistically significant.

RESULTS

Study Design

A comparative study of 60 patients radomixed in to two groups. group a patients are subjected to open hemorrhoidectomy, group b patients are subjected to closed hemorrhoidectomy.

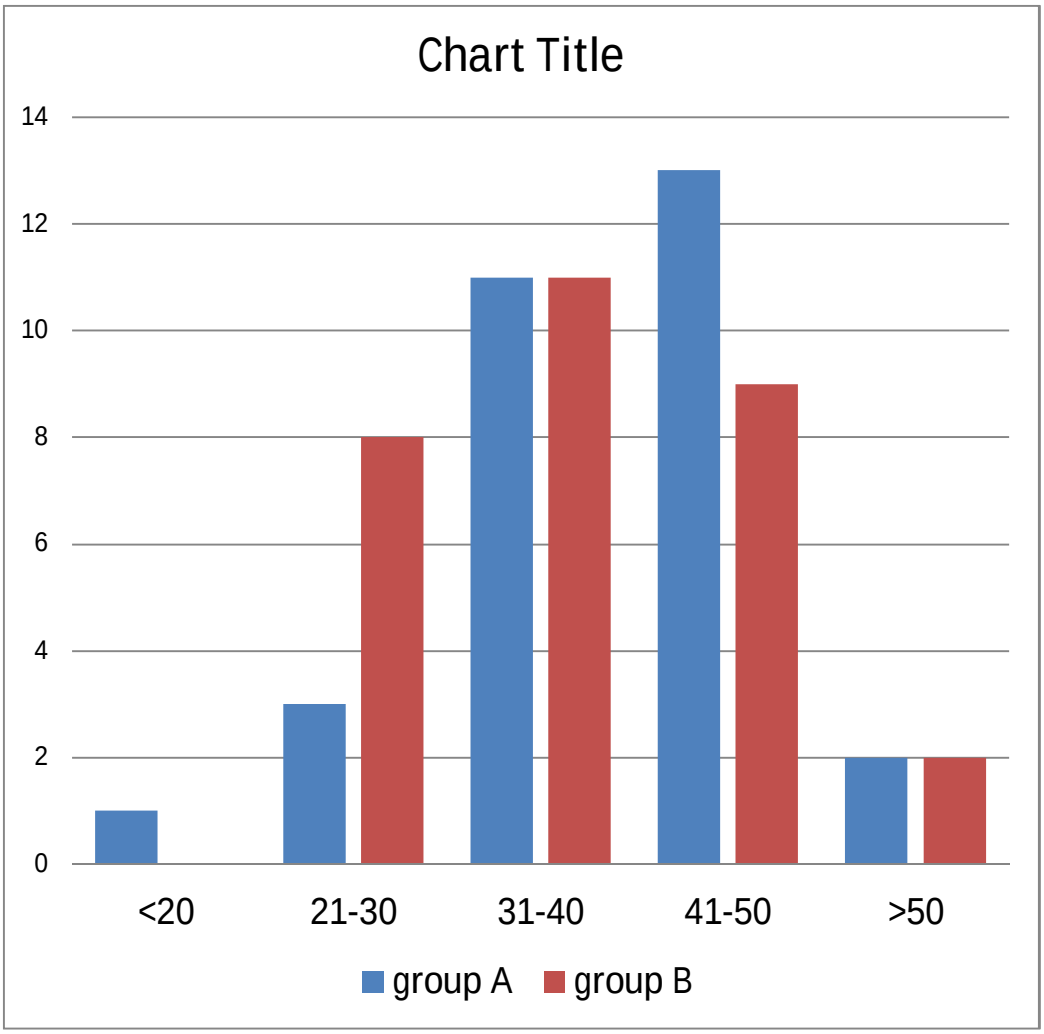
TABLE - 1

COMPARISON OF AGE DISTRIBUTION BETWEEN TWO GROUPS

AGE GROUP	group A OPEN	group B CLOSED
<20	1	0
21-30	3	8
31-40	11	11
41-50	13	9
>50	2	2
MEAN	39.1±10.06	37.77±9.38

SAMPLES ARE AGE MATCHED WITH P =0.3004

COMPARISON OF AGE DISTRIBUTION BETWEEN TWO GROUPS



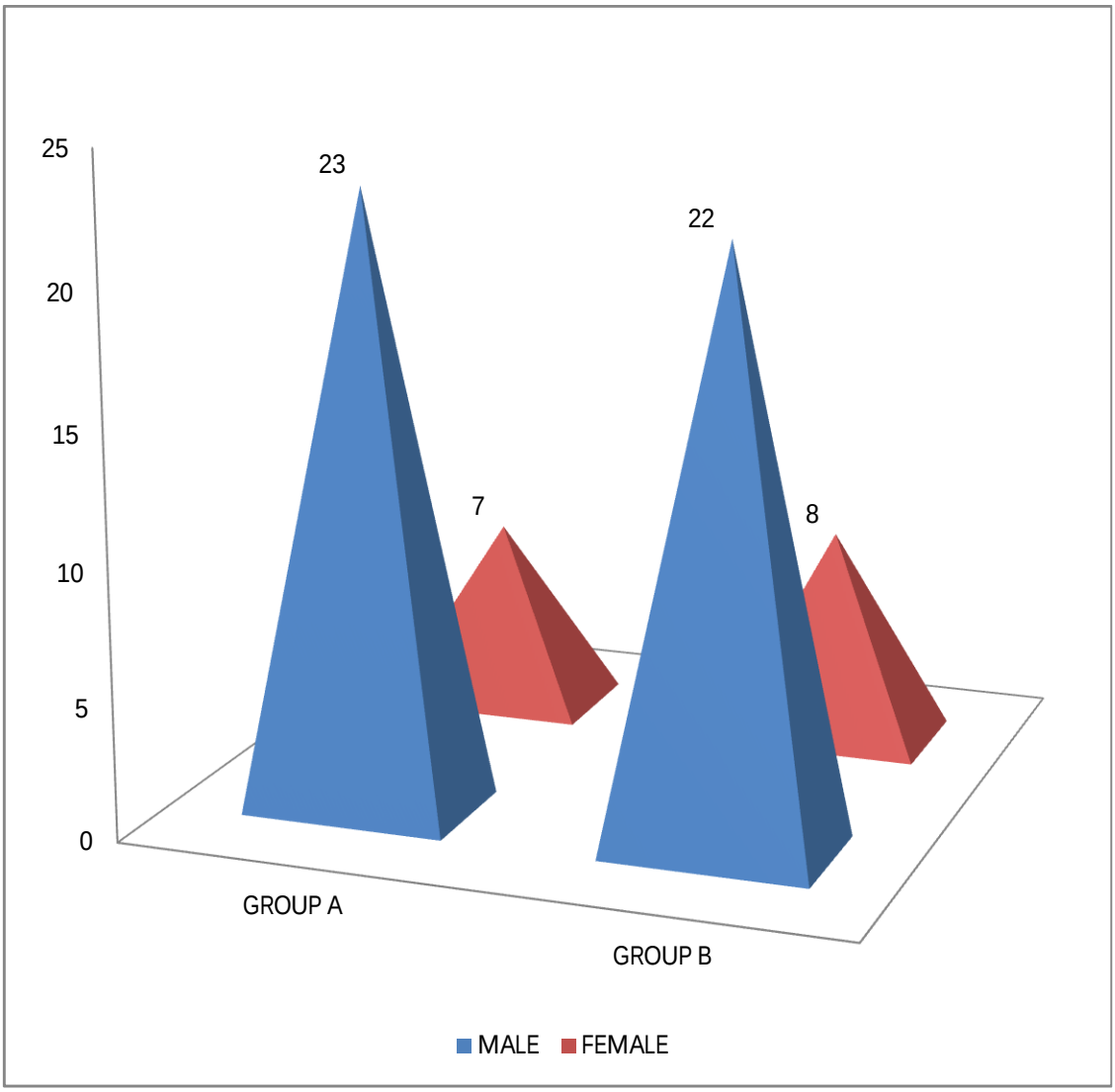
The mean age of group a was 39.1 ranging from 18 to 55, for group b mean age was 37.77 ranging from 22 to 55. the demographic age variable is comparable in both the samples.

TABLE 2:

COMPARISON OF GENDER DISTRIBUTION IN TWO GROUPS

Gender	Group a open	%	Group b closed	%	Total
MALE	23	76%	22	73%	45
FEMALE	7	24%	8	27%	15
TOTAL	30	100	30	100	60

Gender Distribution Is Matched With P Value Of 1.0



In our study out of 60 patients 45 were male and 15 were female. Among the 45 male patients 23 were operated in group a by open method and 22 were operated in group b with closed approach. Amon the 15 females 7 were operated with open method in group a and 8 were operated by closed method in group b.gender distribution in the two groups are matched.

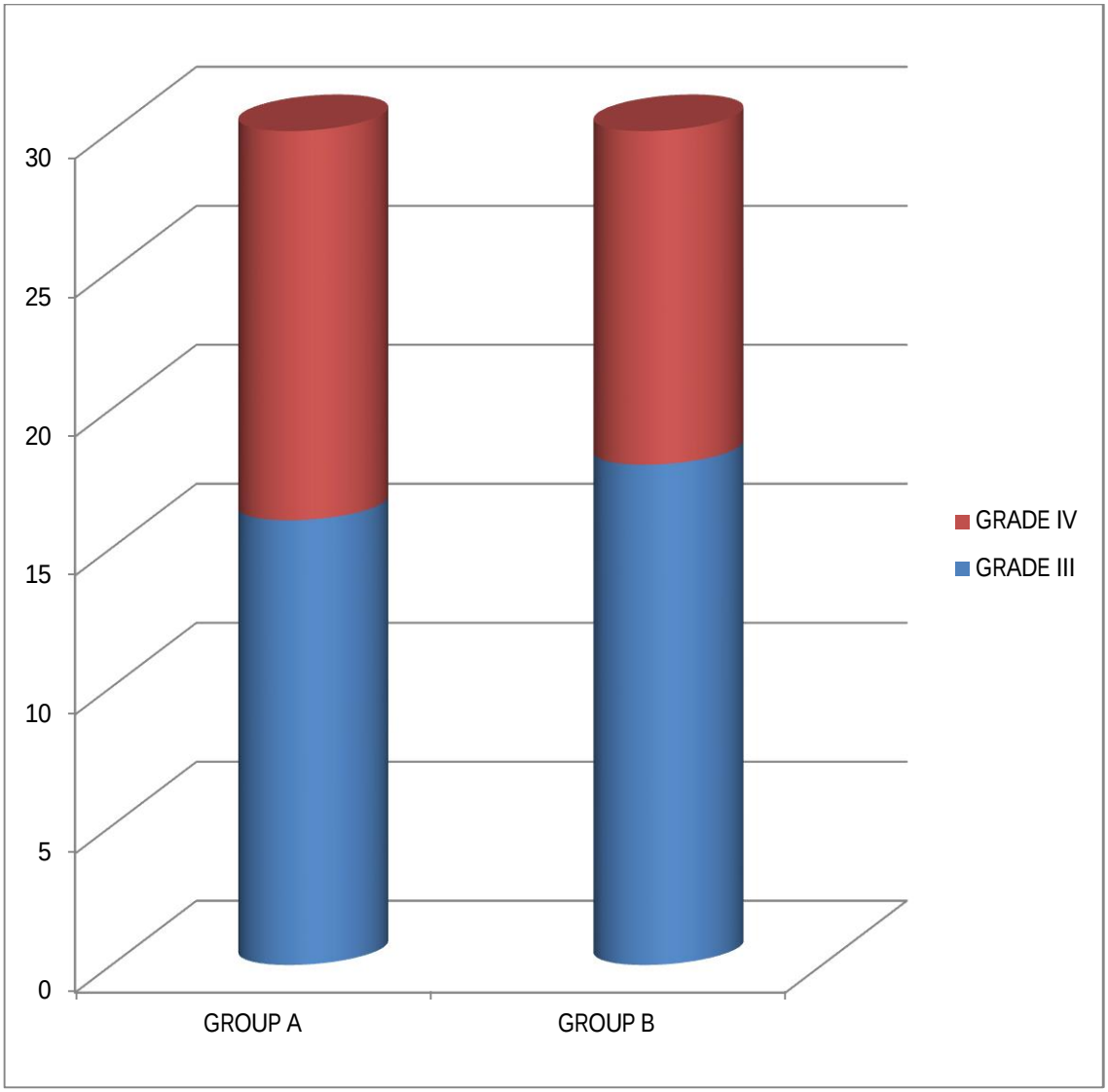
TABLE 3:

COMPARISON OF GRADE OF HEMORRHOIDS IN TWO GROUPS

GRADE OF HEMORRHOIDS	GROUP A OPEN	%	GROUP B CLOSED	%	TOTAL
GRADE III	16	53%	18	60%	34
GRADE IV	14	47%	12	40%	26
TOTAL	30	100%	30	100%	60

Sample are matched based on grade with p value of 0.794

COMPARISON OF GRADE OF HEMORRHOIDS IN TWO GROUPS



In our study out of total 60 patients 34 were grade iii and 26 were grade iv. Among 34 patients with grade iii 16 were operated by open method and 18 were operated by closed method.

Among 26 patients with grade iv 14 were operated by open method and 12 were operated by closed method. Grade were matched between two groups

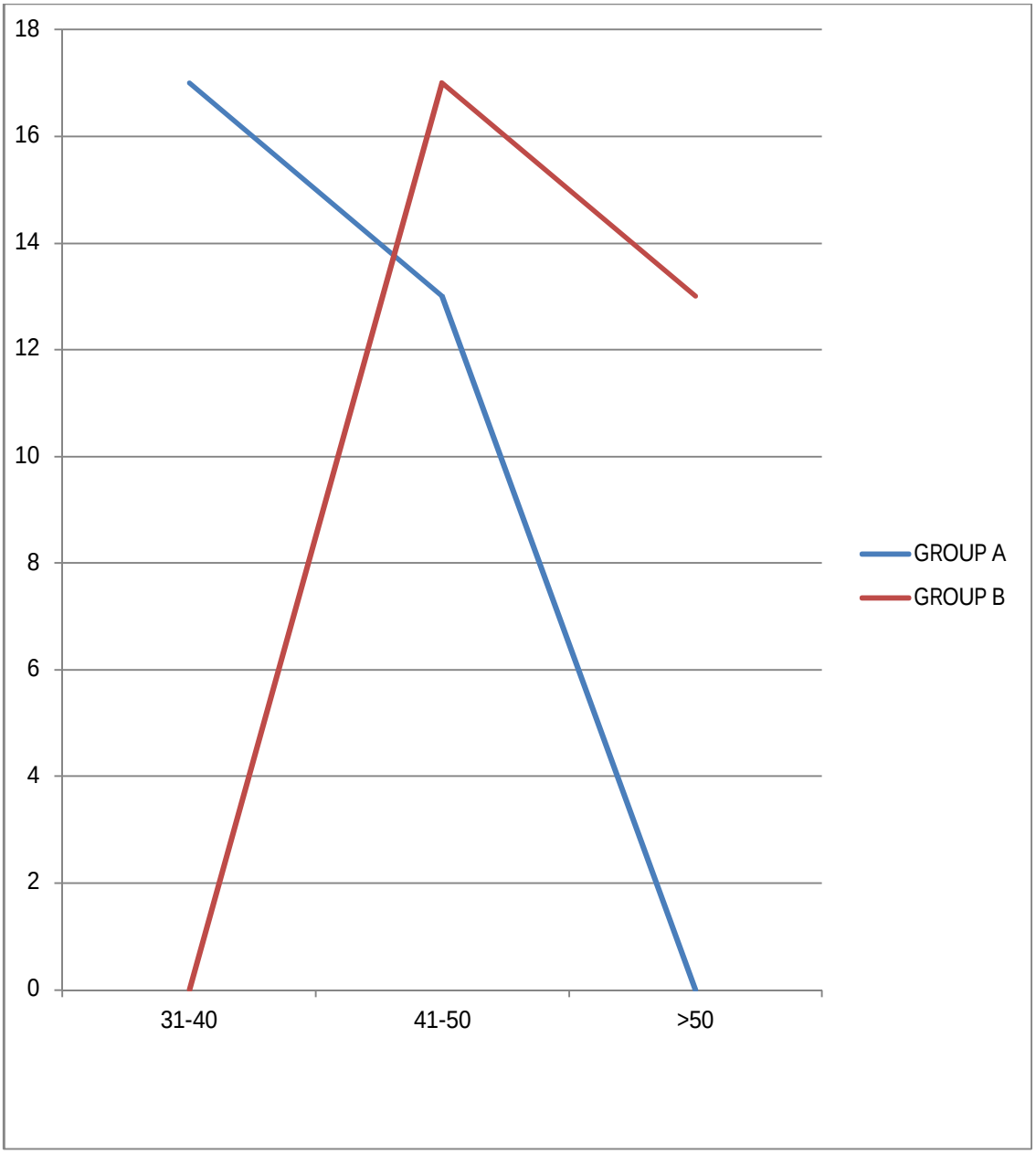
TABLE 4:

COMPARISON OF OPERATIVE TIME OF SURGERIES

OPERATION TIME	GROUP A OPEN	GROUP B CLOSED
31-40	17	0
41-50	13	17
>50	0	13
MEAN±SD	40.533±4.47	49.33±3.352

Duration Of Surgery Is Significantly Low In Open Group A Had P Value Less Than 0.001

COMPARISON OF OPERATIVE TIME OF SURGERIES



Mean operating time for group a open method was 40.53 when compared to closed group mean 49.33, the duration of surgery in open group was significantly lower by 10 minutes when compared to the closed group.

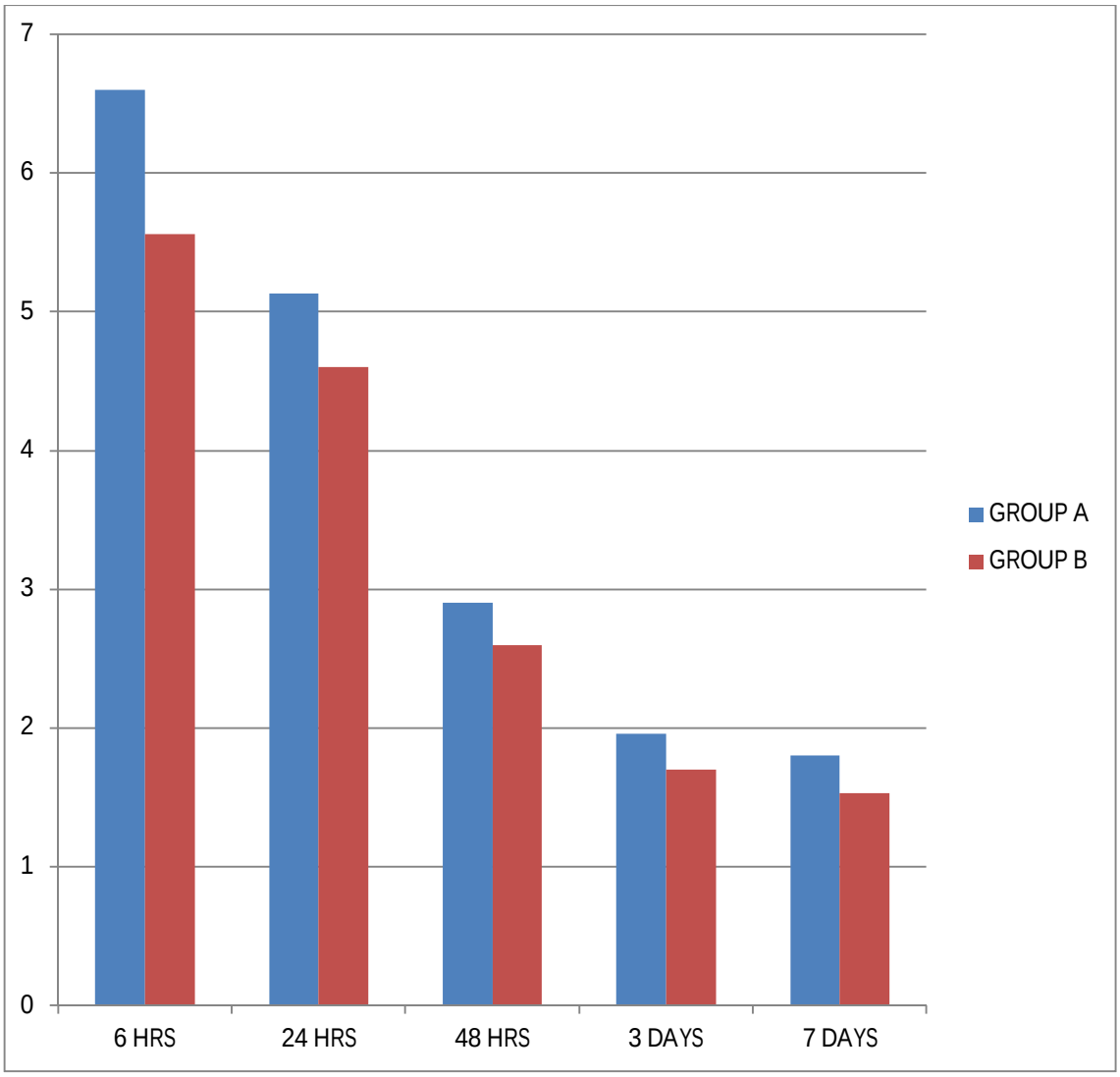
TABLE 5:

COMPARISON OF PAIN SCORE USING VAS IN TWO GROUPS

PAIN SCORE VAS	**GROUP A OPEN**	**GROUP B CLOSED**	**P VALUE**	**T TEST**
6 HRS	6.6±0.8	5.56±0.75	0.0003	5.164
24 HRS	5.13±0.71	4.6±0.84	0.01	2.64
48 HRS	2.9±0.72	2.6±0.56	0.07	1.79
3 DAYS	1.96±0.60	1.7±0.45	0.15	1.445
7 DAYS	1.8±0.65	1.53±0.49	0.07	1.81

P Value Obtained From Mann Whitney U Test

COMPARISON OF PAIN SCORE USING VAS IN TWO GROUPS



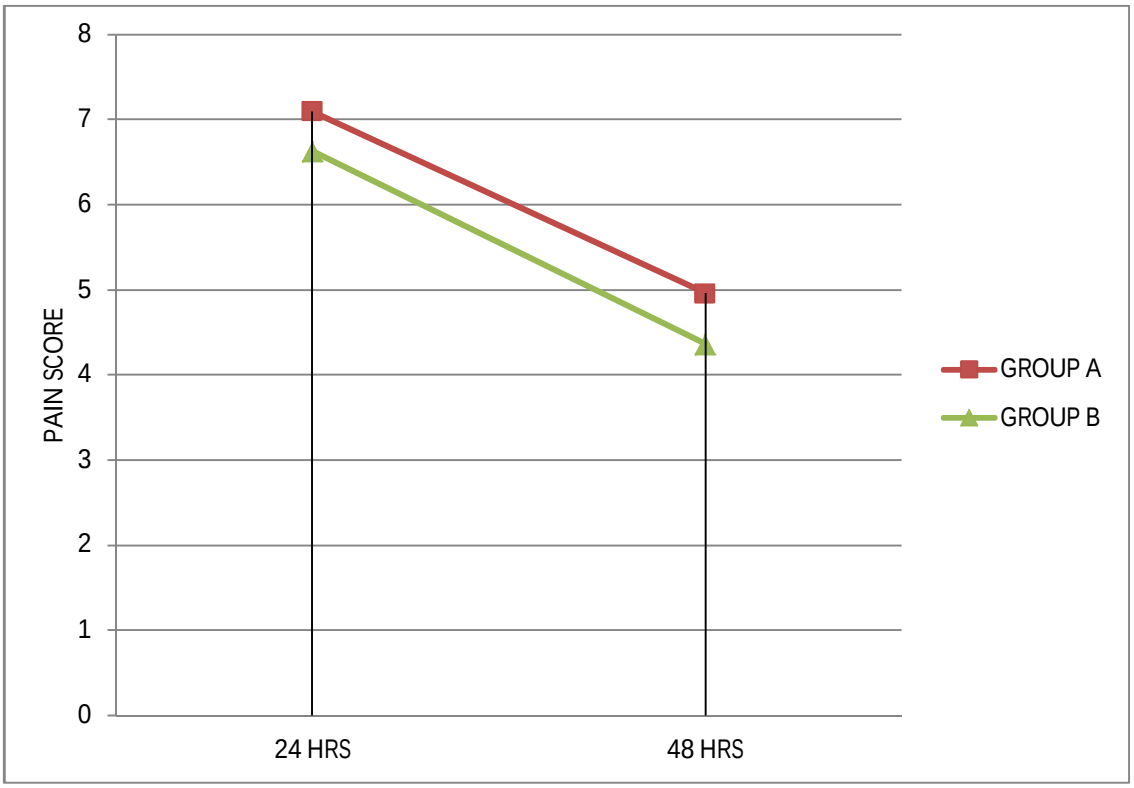
Immediate post operative pain was significantly lower in group a when compared to group b but pain score at 48 hrs 3 days and 7 days did not show any significant differnece.

TABLE 6:

COMPARISON OF POST DEFECATION PAIN SCORES BETWEEN TWO GROUPS

PAIN SCORE VAS POST DEFECATION	GROUP A	GROUP B	P VALUE
24 HRS	7.1±1.011	6.63±0.752	0.045
48 HRS	4.96±0.835	4.36±0.481	0.001

P Value Calculated By Mann Whitney U Test



POST DEFECATI0N PAIN SCORE WAS LOW IN CLOSED GROUP.

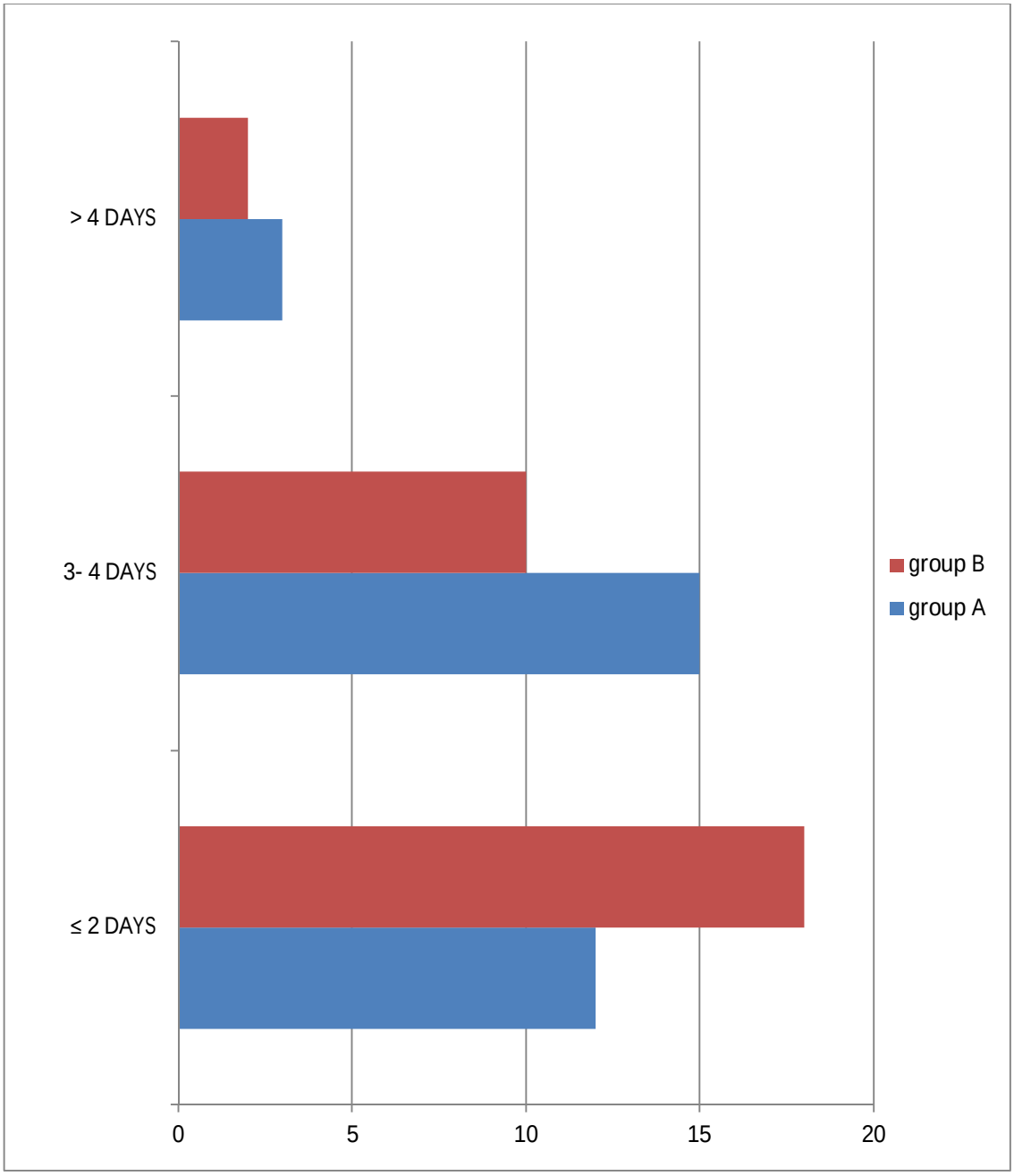
TABLE 7 :

COMPARISION OF DAY OF DISCHARGE BETWEEN TWO GROUPS

DAY OF DISCHARGE	GROUP A OPEN	GROUP B CLOSED
≤ 2 DAYS	12	18
3- 4 DAYS	15	10
> 4 DAYS	3	2

DAY OF DISCHARGE	GROUP A OPEN	GROUP B CLOSED	P VALUE	T TEST
MEAN ±SD	1.73±1.03	2.5±0.85	0.355	0.9288

COMPARISION OF DAY OF DISCHARGE BETWEEN TWO GROUPS



NO OF PATIENTS

TABLE 8:

COMPARISON OF ORAL ANALGESIC REQUIREMENT

	GROUP A OPEN	GROUP B CLOSED	P VALUE
ORAL MEDICATION MEAN	2.2	1.7	0.0049
SD	±0.635	±0.69	

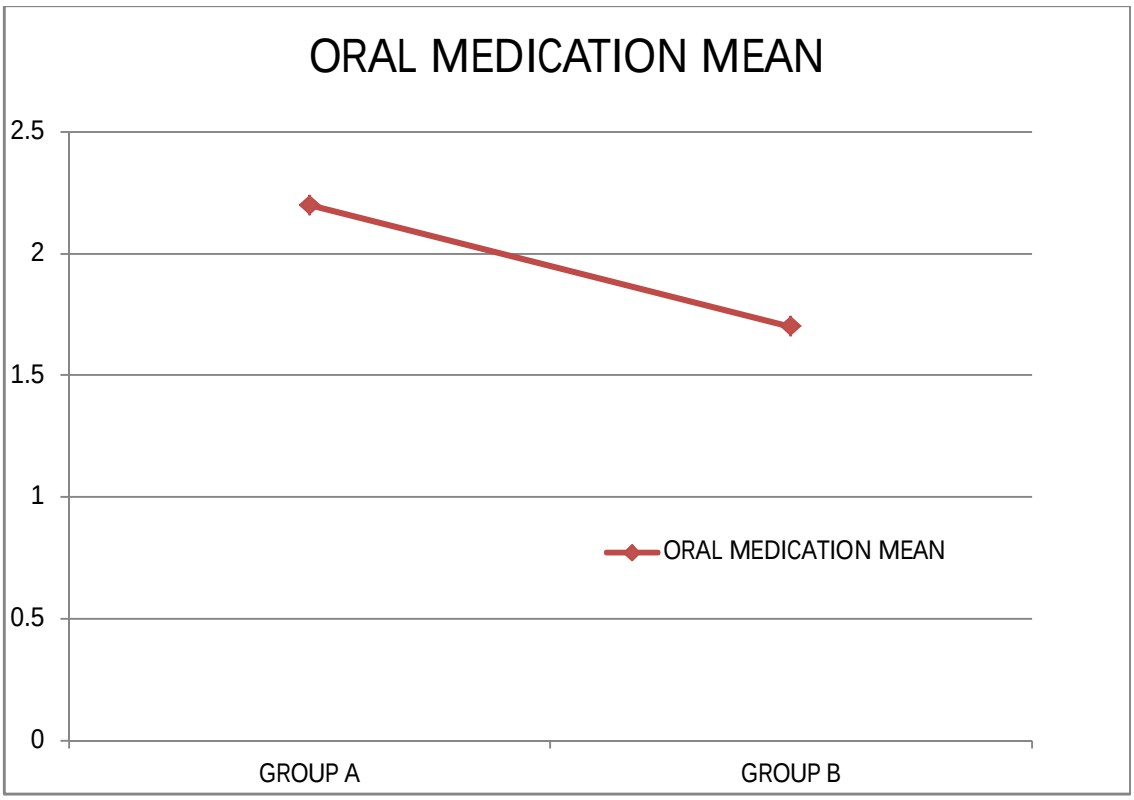
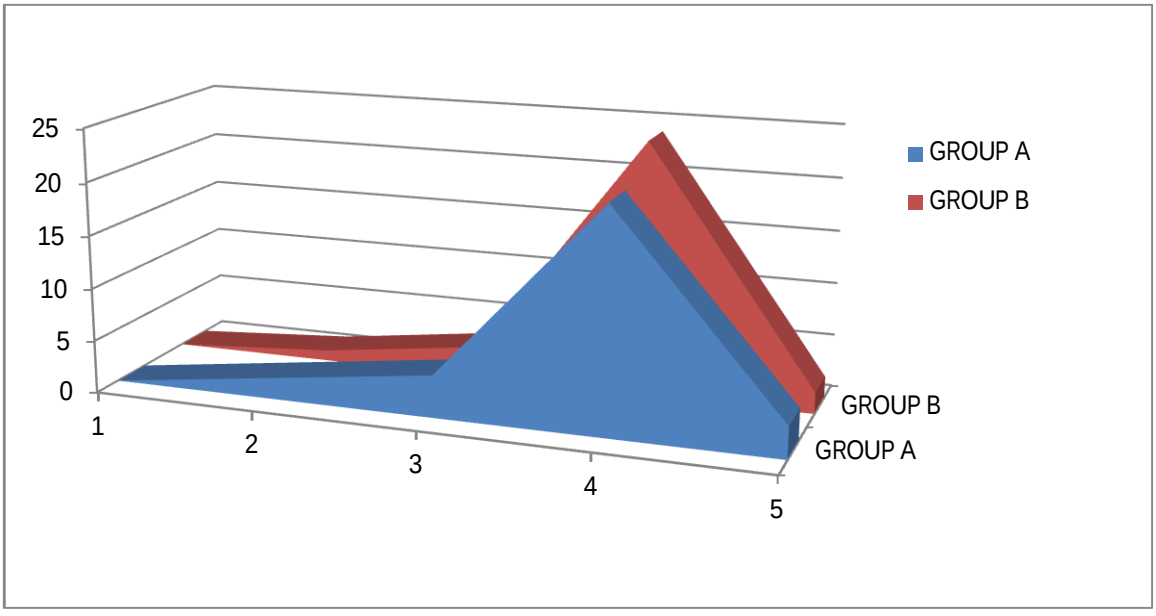


TABLE 9 :

COMPARISON OF SATISFACTION SCORES BETWEEN TWO GROUPS

SATISFACTION SCORE	GROUP A OPEN	GROUP B CLOSED	P VALUE
1	0	0	
2	2	1	
3	4	3	
4	21	24	
5	3	2	
MEAN	3.83	3.9	0.409
SD	±0.687	±0.53	

P VALUE CALCULATED FROM MANN WHITNEY U TEST



Satisfaction score of patients treated in two groups

X axis satisfaction score

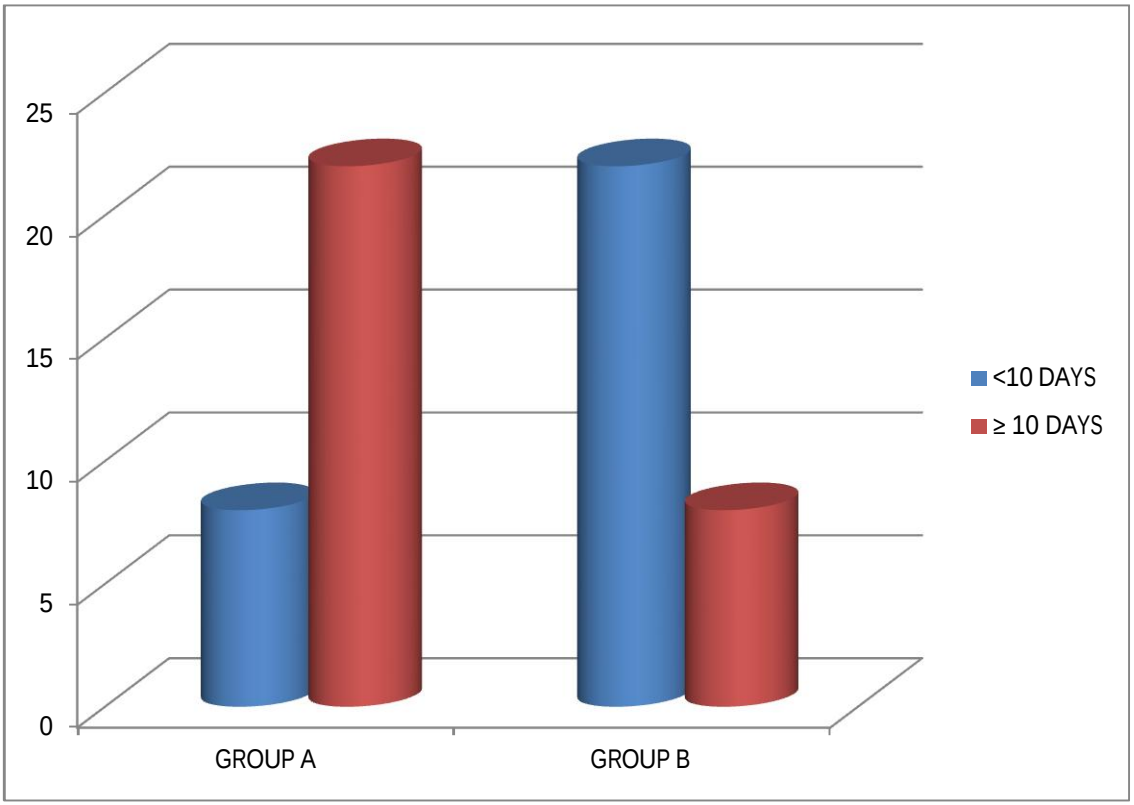
Y axis no of patients

TABLE 10 :

COMPARISON OF RETURN TO WORK BETWEEN TWO GROUPS

RETURN TO WORK	GROUP A OPEN	GROUP B CLOSED	P VALUE	T TEST
<10 DAYS	8	22		
≥ 10 DAYS	22	8		
MEAN	11.766	9.2	0.0019	3.98
SD	±3.23	±3.015		

P VALUE CALCULATED FROM FISHER EXACT TEST



Return to work in two groups

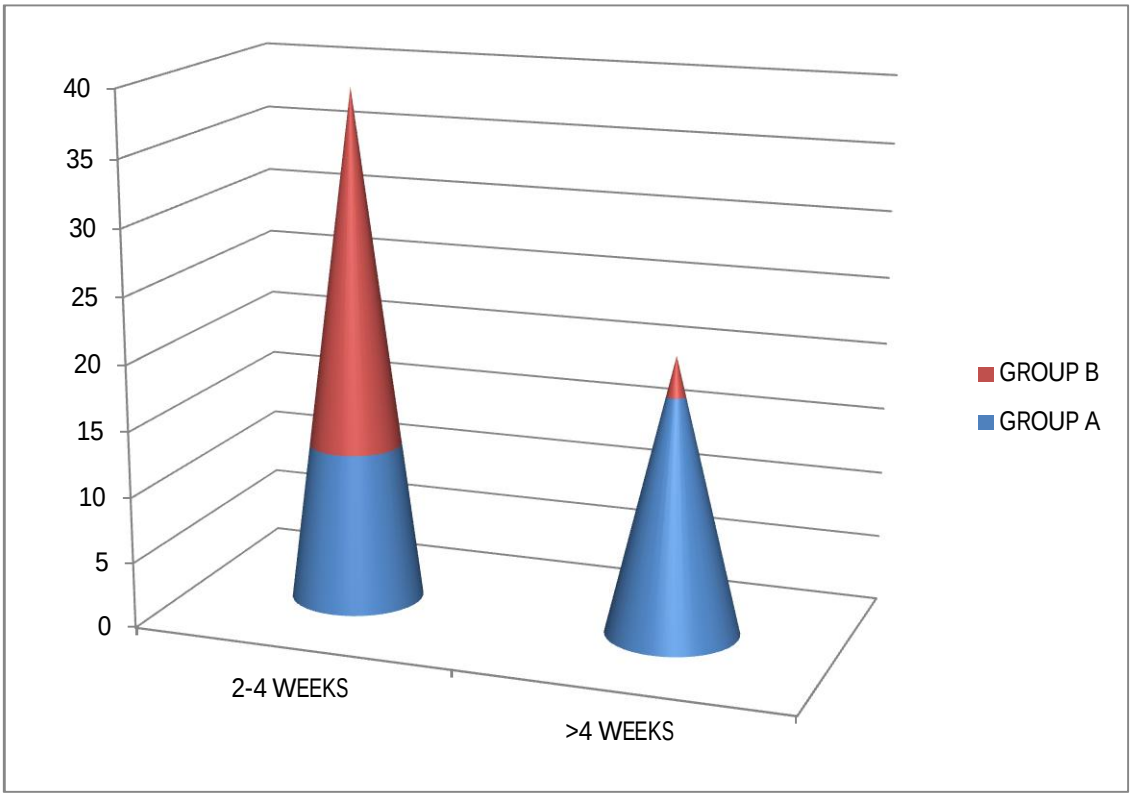
Y axis no of patients

X axis groups

TABLE 11:

COMPARISION OF WOUND HEALING RATE BETWEEN TWO GROUPS

WOUND HEALING RATE	GROUP A OPEN	GROUP B CLOSED	P VALUE
2-4 WEEKS	12	27	
>4 WEEKS	18	3	
MEAN	4.766	2.586	0.001
SD	0.882	0.611	



Patinets in group b had faster wound healing rate with mean of 2.5 weeks in comparison to group a which had a mean of 4.76.

TABLE 12:

POST OPERATIVE COMPLICATIONS BETWEEN TWO GROUPS

POST OP COMPLAINTS	GROUP A OPEN	GROUP B CLOSED	P VALUE
BLEEDING AT 24 HRS	14	8	0.1798
BLEEDING AT 48 HRS	10	6	0.381
INFECTION	1	3	0.6119
INCONTINENCE AT 3 WKS	4	3	1
INCONTINENCE AT 6WKS	2	1	0.99
URINARY RETENSION	4	6	0.73
ANAL STENOSIS	2	4	0.67

Post operative bleeding was present in 14 patients in group a and 8 patients in group b at 24 hrs . At 48 hrs post op bleeding was present in 10 patients of group a and 6 patients of group. Post operative bleeding was mild and was managed by stool softeners , sitz bath . No intervention was required in the two groups .

Surgical site infection was present in one patient of group a and 3 patient s in group b. It was managed conservatively with antibiotics. No statistical difference was present between the two groups.

Incontinence was present in few patinets of both groups which was not satistically significant and the patients were managed by bulk forming agents. Urinary retention was present in 4 patients in group a and 6 patients in group b, no significant difference would be noted between two groups. four patients in closed group and two in open group required anal dilatation for stenosis during folllowup.post operative complication between the two procedure did not show any statistical difference.

DISCUSSION

Among The Tissues Of The Digestive Tract Anal Canal Lining Is Most Richly Innervated Tissue. Major Worry After Hemorrhoidectomy Was Post Operative Pain. Conventional Hemorrhoidectomy That Is Considered As Gold Standard Treatment Has Withstood The Test Of Time, But Has Been Associated With Significant Post Operative Morbidity That Is Pain. Emphasis Has Been Applied For Management Of Post Operative Pain As It Is Also Related To Urinary Symptoms. Varied Amount Of Studies Has Been Published In The Literature In An Attempt To Identify Approaches With Reduced Post Operative Morbidity. Stapled Hemorrhoidectomy Has Been Shown In Many Randomized Trials To Have Less Post Operative Morbidity.

Conventional Hemorrhoidectomy Is Still The Procedure Of Choice Because Of Low Expense And Ease Of Technique, Even Though Many Newer Procedures Have Subsequently Been Proposed. As Open Hemorrhoidectomy Leaves A Large Wound Are For Healing By Secondary Intention, They Are Associated With Considerable Post Operative Pain. Due To Loss Of Anoderm There Is Reduced Anal Sensation In Open Procedure. Open Hemorrhoidectomy May Be Associated With Anal Stenosis Due No Scar Retraction. Open Wound In Anal Canal Has Been Implicated In Post Op Morbidity. For The Same Reason Closed Hemorrhoidectomy Can Be Recommended.

In Many Countries Now Closed Hemorrhoidectomy Has Gained Attention Because Of Faster Wound Healing, Better Patient Compliance And Less Post Operative Pain. Nonetheless, Randomized Controlled Trials Have Reported Conflicting Results About Closed Vs. Open Hemorrhoidectomy. We Are Conducting This Study To Compare The Post Operative Outcomes, Complications , Wound Healing Rates Following Closed And Open Hemorrhoidectomy .

About Sixty Patients Undergoing Hemorrhoidectomy In Chengalpattu Medical College Hospital, Who Have Fulfilled The Criteria Have Been Selected And Included In Our Study. Patients Are Randomized In To Two Groups. Group A Will Have 30 Patients Undergoing Open Hemorrhoidectomy. And Group B Will Have 30 Patients Undergoing Closed Hemorrhoidectomy. The Mean Age Of Group A Sample Was 39.1 Yrs With Standard Deviation Of 10.06 Yr. The Mean Age Of Group B Was 37.77 Yrs With SD Of 9.229 Years. The Age Demographic Characteristics Of The Two Groups Are Comparable As Per The P Value Of 0.304.

In Our Study Out Of 60 Patients 45 Were Male Of Whom 23 Were In Group A And 22 In Group B. The Rest 15 Were Female With 7 Being Operated In Group A And 8 In Group B. The Gender Demographic Variable Is Also Comparable Between The Two Groups With P Value of 1.0.

Out Of 34 Patients With Grade Iii, 16 Patients Were Operated In Group A And 18 Patients Were Operated In Group B. Out Of 26 Patients In Grade Iv, 14 Were Operated In Group A And 12 Were Operated In Group B. Samples Are Matched Based On Grade With P Value Of 0.794.

The Duration Of Operation Was Compared Between Two Groups. In Group A Mean Operation Time in Minutes Was 40.5, Ranging From 30 To 50 Minutes. In Group A 56% Were Operated Within 40 Minutes And Remaining 44 % Were Operated Within 50 Minutes. In Group B the Mean Operation Time In Minutes Was 49.33, Ranging From 40 To 55 Minutes. In Group B 56 % Were Operated With In 50 Minutes And Rest Was Operated Within 60 Minutes. The Operating Time for Open Hemorrhoidectomy Was Significantly Less Than Closed Hemorrhoidectomy with P Value of 0.001 and t=5.56.There Was No Intraoperative Complications And All The Pedicles Were Ligated Without Any Failure. The Time Difference Of Less Than 10 Minutes Can Be Neglected As It Did Not Affect The Post Operative Morbidity.

This Is Consistent With The Studies Of Aziz A, Et Al , Arbman G, Et Al,Pokharel N , Et Al , Hadi A, Et Al, Giordano P, Et Al . In Our Study The Post Operative Pain Was Managed By French Anesthesia Society Guidelines And Was Scored Using Visual Analog Scale From 0 To 10. Patients Were Administered Analgesics as Required.

Comparison Was Done Between Two Groups With Regards To Pain Vas Score. The Pain Scores Were Noted At 6 Hrs, 24 Hrs, 48 Hrs, 3 Days, 7 Days And Post Defecation At 24 Hrs And 48 Hrs. In Our Study the Mean Pain Score at 6 Hours Was 6.6 for Group A And 5.56 For Group B. The Pain Score at 6 Hours Was Significantly Low In Closed Hemorrhoidectomy with P Value of 0.0003 and T = 5.16. The Mean Score At 24 Hrs For Group A Was 5.133 And 4.6 For Group B Which Was Also Statistically Significant With p Value Of 0.015.

But The Mean Pain Score At 48 Hrs, 3 Days And 7 Days Did Not Show Any Significant Difference Between The Two Groups. Hence The Early Post Operative Pain Was Significantly Low In Closed Hemorrhoidectomy Group In Comparison To Open Approach. The Mean Post Defecation Pain Score At 24 Hours For Group A Is 7.1 And Group B Is 6.63 With P Value Of 0.045. Post Defecation Pain Score At 48 Hrs For Group A Is 4.96 And Group B Is 4.36 With P Value Of 0.001.Thus The Post Defecation Pain Score Following Hemorrhoidectomy Is Significantly Low For Closed Hemorrhoidectomy In Comparison To Open Approach.

The Mean Analgesic Requirement For Group A Is 2.2 And Group B Is 1.7 With P Value Of 0.004. Thus The Analgesic Requirement Is also Low For The Closed Hemorrhoidectomy Group. The Above Results Of Reduction In Early Postoperative Pain And Post Defecation Pain Following Closed Hemorrhoidectomy Along With Reduced Analgesic Requirement Is Consistent With Following Studies.

1. Pokharel N, Et Al Compared Outcomes Of Open And Closed Technique. They Noted Significantly Less Pain And Lesser Need For Analgesics And Faster Wound Healing In Closed Group.
2. Hadi A, Et Al Studied The Outcome Of Open Vs Closed Hemorrhoidectomy Using 50 Subjects With Grade Iii& Iv Hemorrhoids And Noted That Pain Was Significantly Lesser In Closed Group.
3. Arroyo A, Et Al Compared Results Of 100 Patients Undergoing Hemorrhoidectomy With Open And Closed Approach And Concluded That Post Operative Pain Was Significantly Less In Closed Group.
4. Guenin Mo, Et Al Analyzed And Concluded That Closed Hemorrhoidectomy Was Associated With Low Perioperative Morbidity
5. Hamid I. Jasim Et Al Studied Short Term Outcome Of Closed And Open Hemorrhoidectomy And Concluded That Post Op Pain Was Less In Closed Group

But There Were Controversial Results About Post Operative Pain Reduction Following Closed Hemorrhoidectomy In Studies Conducted By Carapeti Et Al, Gencosmanoglu Et Al, Ho Et Al, Arbman Et Al Etc With Some Favoring Open Approach And Others Documenting No Difference Between Both The Techniques.

The Mean Time Of Discharge For Group A Was 2.73 And Group B Was 2.5 With P Value Of 0.3567. There Was No Difference In Hospital Recovery Between Two Groups. The Mean Wound Healing Time For Group A Was 4.76 And Group B Was 2.58 With P Value Less Than 0.001. Several Studies Have Documented Faster Wound Healing Rates Among The Closed Hemorrhoidectomy Group.

This Results Is Consistent With Following Studies

1. Aziz A, Et Al Compared Outcomes Following Open And Closed Hemorrhoidectomy In 177 Patients,(49)
2. Arbman G, Et Al Compared Results Of Closed And Open Methods Of Hemorrhoidectomy Regarding, Concluded That The Closed Method Was Better Than Open Method Only In Terms Of Wound Healing Rates.(50)
3. Pokharel N, Et Al Compared Outcomes Following Hemorrhoidectomy By Open And Closed Technique And Noted Faster Wound Healing.(51)
4. Hadi A, Et Al Compared Wound Healing Following Open And Closed Hemorrhoidectomy In 50 Patient(52)
5. Gencosmanoglu R, Et Al In His Study of 80 Patients With iii And Iv Degree Hemorrhoids Compared Open and Closed Methods Of Hemorrhoidectomy(54)

6. Arroyo A, Et Al Compared Results Of 100 Patients Undergoing Open Hemorrhoidectomy With 100 Patients Undergoing Closed Hemorrhoidectomy For Symptomatic Hemorrhoids(55)
7. Guenin Mo, Et Al Analyzed Long Term Results Of Fergusons Closed Hemorrhoidectomy (56)

The Satisfaction Score Mean For Group A Was 3.83 And For Group B Was 3.9 With P Value Of 0.409. No Statistical Difference Noted Between The Two Approaches.

The Mean Value For The Duration Required For Return To Work For Group A Was 11.76 In Comparison To Group B With 9.2 With P Value Of 0.002 And T = 3.96. There Was Significant Difference In Mean Duration Required To Return To Work. The Patients In Group B Following Closed Approach Returned To Work Bit Early Compared To Closed Group.

The Post Operative Complication Such As Bleeding, Infection, Incontinence, Urinary Retention And Anal Stenosis Were Noted In Both The Groups Following Open And Closed Approach Without Any Significant Difference.

CONCLUSION

There Are Reports Of Better Post Operative Outcome Following Closed Hemorrhoidectomy In Terms Of Pain And Wound Healing. Both Open And Closed Approach Are Less Expensive And Safe, Easy To Perform With Satisfactory Results.

We Found That The Important Advantages Of Fergusons Closed Approach Over The Millian Morgan Open Approach. They Are Reduced Pain In Immediate Post Operative Period And At 24 Hours With Fewer Analgesic Pills Required To Control The Pain , Leading To Reduced Hospital Stay And Early Return To Work Along With Better Wound Healing Rate. But The Closed Technique Has These Advantages At The Expense Of Longer Operative Time, Which Can Be Neglected As It Did Not Affect The Outcome.

In Short We Think That Patients With Grade III And IV Hemorrhoids Who Are Operated With Fergusons Closed Hemorrhoidectomy Have Better Results.

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PROFORMA

Name: **Hospital No :**

Age : **Case No :**

Sex :

Complaints :

H/o present illness:

Previous surgery:

General examination :

CVS :

RS :

CNS :

ABDOMEN:

P/R :

PROCTOSCOPY:

PLAN OF MANAGEMENT:

INVESTIGATIONS

1. Hemoglobin
2. Bleeding time
3. Clotting time
4. RFT , LFT
5. VCTC
6. CXR
7. USG Abdomen
8. Pus culture and sensitivity
9. Sigmoidoscopy

Operative notes

Post operative events

Pain score

S.no	Time	Pos op pain	Post defecation pain	Drugs
1.	6 hrs			
2.	24 hrs			
3.	48 hrs			
4.	3 days			
5.	7 days			

Day of discharge

Discharge advice

Follow up status

MASTER CHART (GROUP-A)

Name	Age	G	Gr	Dr	P.O. PS					PD PS		D. D	OM					WH	B 24	B 48	INF	INT 3WK	INT 6 Wk	UR	AS
					6 hrs	24 hrs	48 hrs	3d	7d	24 hrs	48 hrs		6	24	48	SS	RW								
MANIMARAN 1828	22	m	III	39	7	5	4	3	3	8	6	4	3	2	2	3	9	3	N	N	N	N	N	Y	N
PADMANABAN 68670	32	m	III	41	8	6	3	1	2	9	7	5	3	2	2	5	6	3	Y	N	N	Y	Y	N	N
MUTHAN 6887	37	m	III	44	7	5	2	2	1	8	6	4	3	2	1	4	10	4	Y	N	N	N	N	N	N
DHURAI 9347	63	m	III	37	6	5	4	1	2	7	6	2	2	1	1	4	10	4	N	N	N	N	N	N	N
ARMUGAM 10786	45	m	III	38	7	6	3	2	2	7	5	4	3	3	2	4	15	5	N	Y	N	N	N	N	N
DURAISAMY 11820	26	m	III	34	6	5	3	2	2	7	6	2	2	2	1	5	6	5	Y	N	N	N	N	N	Y
MADHURAI 10070	50	m	III	36	7	5	3	2	1	8	5	3	3	2	2	4	15	4	N	N	N	N	N	N	N
VANKATSH 14871	42	m	III	40	7	5	3	3	2	7	5	3	3	3	1	5	6	4	N	Y	N	N	N	N	N
SRINIVASAN 24104	50	m	IV	38	8	6	2	2	1	8	6	2	3	3	2	2	15	4	Y	N	N	N	N	N	N
vanni 12882	36	f	III	39	7	6	3	2	2	9	6	5	3	2	2	4	10	4	Y	Y	N	Y	Y	Y	N
MURUGAN 4607	32	m	III	37	7	6	4	2	2	8	5	3	3	2	2	4	15	5	Y	N	N	N	N	N	Y
KASI 44067	44	m	III	36	6	5	2	3	3	8	5	3	3	2	1	4	15	5	Y	Y	N	Y	N	N	N
rajalakshmi 21174	42	f	III	35	6	5	4	3	3	7	5	3	3	3	2	3	15	5	N	N	N	N	N	N	N
MANOGAR 22341	35	m	III	39	7	6	2	1	1	7	5	2	3	2	1	4	10	4	N	N	N	N	N	N	N
VERAPPA 31243	38	m	III	38	8	6	3	2	2	8	5	3	3	3	2	4	11	5	Y	Y	N	N	N	N	N
varhsa 7708	39	f	III	31	6	5	3	2	2	9	6	5	2	2	2	4	12	5	Y	N	N	Y	N	Y	N
MARIYAPPAN 6078	24	m	IV	46	6	4	3	1	1	7	5	2	3	2	2	4	12	4	N	N	N	N	N	N	N

Name	Age	G	Gr	Dr	P.O. PS					PD PS		D. D	OM					WH	B 24	B 48	INF	INT 3WK	INT 6 Wk	UR	AS
					6 hrs	24 hrs	48 hrs	3d	7d	24 hrs	48 hrs		6	24	48	SS	RW								
SANTHOSH 9087	42	m	IV	40	6	5	2	2	1	6	4	1	3	2	2	2	15	6	N	Y	Y	N	N	N	N
saritha 26015	31	f	IV	43	7	6	4	2	2	6	4	2	3	2	1	4	15	5	N	N	N	N	N	N	N
SENTHIL 21890	37	m	IV	42	6	4	2	2	1	5	4	2	3	3	2	4	12	6	Y	Y	N	N	N	N	N
VINOTH 22318	46	m	IV	40	6	4	2	2	2	6	4	2	2	2	2	4	11	6	N	N	N	N	N	N	N
ABINAV 24390	58	m	IV	41	6	4	2	1	1	7	5	3	2	2	1	3	9	6	N	N	N	N	N	N	N
VISWA 41378	18	m	IV	42	7	5	2	2	2	6	4	2	3	2	2	3	15	6	Y	Y	N	N	N	N	N
RAM 35644	50	m	IV	45	7	6	4	3	3	6	4	2	3	2	2	4	15	5	N	N	N	N	N	Y	N
nithya 41831	27	f	III	39	7	5	3	2	2	6	4	2	3	2	2	4	15	5	N	N	N	N	N	N	N
KARTHIKEYAN 24182	47	m	IV	44	8	6	3	1	1	7	5	2	3	2	2	4	15	4	Y	N	N	N	N	N	N
sindhu 32908	39	f	IV	45	6	5	3	2	2	7	4	3	2	2	2	4	6	4	Y	Y	N	N	N	N	N
SAMPATH 34708	42	m	IV	50	6	5	4	2	1	6	4	2	3	2	1	4	9	6	Y	Y	N	N	N	N	N
RAMESH 39787	45	m	IV	48	5	4	3	2	2	7	5	2	2	1	2	4	9	6	N	N	N	N	N	N	N
ishwarya 7439	34	f	IV	49	5	4	3	2	2	6	4	2	3	2	2	4	15	5	N	N	N	N	N	N	N

MASTER CHART (GROUP-B)

Name	Age	G	Gr	Dr	P.O. PS					PD PS		D. D	OM					WH	B24	B48	INF	INT 3WK	INT 6 Wk	UR	AS
					6 hrs	24 hrs	48 hrs	3d	7d	24 hrs	48 hrs		6	24	48	SS	RW								
RAJESH 21462	39	M	III	51	5	4	3	2	2	6	5	2	2	2	1	4	7	2.4	N	N	N	N	N	Y	N
KASTHURI 24355	50	F	III	53	5	4	4	2	2	6	4	2	2	2	1	4	7	2.4	Y	N	N	N	N	N	N
ARUNNERO 4889	39	M	III	52	5	5	3	1	1	6	4	3	3	2	1	4	8	2	N	N	N	N	N	Y	N
DEVAGI 7001	55	F	III	49	5	4	2	2	2	7	5	2	2	1	2	4	7	2.5	N	Y	N	N	N	N	N
BAGIYARAJ 2998	42	M	III	46	7	6	3	2	2	7	5	2	2	1	1	4	8	2.5	N	N	N	N	N	N	N
GOWRI 6942	40	F	III	49	7	6	3	2	1	8	5	1	2	1	1	5	7	2.5	N	Y	N	Y	Y	Y	N
PRABAKAR 31983	32	M	III	45	5	4	2	1	2	6	4	2	2	2	1	4	8	2.4	N	N	N	N	N	N	N
SRIKANTH 8449	22	M	III	48	5	5	3	2	1	7	5	2	2	1	1	4	8	2	N	N	N	N	N	N	N
KALIYAMMAL 6940	40	F	IV	51	5	4	3	2	2	7	4	2	2	1	1	4	8	2.2	N	N	N	N	N	Y	Y
ASHOK 32991	28	M	III	46	6	5	2	1	2	6	4	2	1	1	2	4	8	2.4	N	N	N	N	N	N	N
VELU 29943	42	M	III	55	5	3	2	2	1	6	4	2	2	1	2	5	5	2.5	Y	Y	Y	N	N	N	N
KOMALA 5150	23	F	III	46	5	4	2	2	2	5	4	2	1	2	3	4	16	3.7	Y	Y	N	N	N	N	N
PANDURANGAN 6679	38	M	IV	45	5	4	3	1	1	6	4	3	2	1	2	4	5	2.5	N	Y	Y	N	N	N	N
MUNNIYAMMAL 11182	29	F	III	44	5	4	2	2	2	6	4	2	3	1	1	4	9	2.5	N	N	N	N	N	N	N

Name	Age	G	Gr	Dr	P.O. PS					PD PS		D. D	OM					WH	B24	B48	INF	INT 3WK	INT 6 Wk	UR	AS
					6 hrs	24 hrs	48 hrs	3d	7d	24 hrs	48 hrs		6	24	48	SS	RW								
MEERABAI 19660	37	F	III	52	5	4	2	2	1	7	4	2	3	2	1	4	8	2	N	N	N	N	N	N	N
GANESH 9198	47	M	III	49	5	4	2	1	1	6	5	2	2	1	1	3	12	2.4	N	N	N	N	N	N	N
SHIVA 31998	36	M	III	46	6	5	2	1	1	7	4	3	2	1	1	4	9	2.5	Y	Y	Y	N	N	N	N
BASKER 21999	41	M	III	42	6	5	3	1	1	6	5	2	2	2	2	4	11	2	N	N	N	N	N	N	N
THILAGAVATHI 29466	30	F	III	50	7	6	3	2	2	7	4	2	3	1	1	4	7	2.5	N	N	N	N	N	N	N
PANDIAN 4990	38	M	IV	52	6	4	3	2	1	7	4	2	2	1	1	4	15	3.7	Y	N	N	N	N	N	N
KAMESH 3779	29	M	IV	52	6	6	3	2	2	7	5	3	3	2	1	2	15	4.2	N	N	N	N	N	N	N
RAMESH 26678	38	M	IV	51	7	6	3	2	2	8	4	5	3	3	1	4	9	2.4	Y	N	N	Y	Y	Y	Y
RAJESH KUMAR 2146	21	M	IV	50	7	6	3	2	1	8	5	3	2	2	1	4	8	2.4	N	N	N	N	N	N	N
NAGARAJAN 15215	33	M	IV	49	5	4	2	1	2	7	4	5	2	2	1	4	7	2.4	N	N	N	N	N	N	N
SARAGAM 34009	46	M	IV	51	5	4	3	2	1	6	4	3	3	3	2	3	15	4.2	Y	N	N	N	N	N	N
NATARAJ 3353	50	M	IV	54	6	5	2	2	1	8	5	3	2	2	1	4	10	2.2	N	N	N	Y	N	N	Y
VENKAT 6297	49	M	IV	48	5	4	3	2	2	7	5	3	3	2	1	3	15	4.1	Y	N	N	N	N	Y	Y
SEKAR 22255	45	M	IV	55	5	4	2	2	2	6	4	3	2	1	1	4	8	2.4	N	N	N	N	N	N	N
TAMILARAU 25649	22	M	IV	47	6	5	3	2	1	7	4	2	2	2	1	4	8	2	N	N	N	N	N	N	N
NAZIR 34829	52	M	III	52	5	4	2	1	2	6	4	3	3	2	1	4	8	2	N	N	N	N	N	N	N

ABBREVIATION

Y	-	Yes
N	-	No
Gr	-	Grade
Dr	-	Duration of Surgery
P.O.	-	Post Operative
P.S	-	Pain Score
PD	-	Post Defecation
OM	-	Oral medication
SS	-	Satisfaction Score
RW	-	Return to work
WH	-	Wound Healing
B	-	Bleeding
DD	-	Day of Discharge
INF	-	Infection
INT	-	Incontinence
UR	-	Urinary Retention
AS	-	Anal Stenosis

INFORMED CONSENT FORM

(This is only a guideline – Relevant changes to be made as per the study requirements)

Title of the Study : "_____ _____".

Name of the Participant : _____.

Name of the Principal (Co-Investigato_____.

Name of the Institution:_____.

Name and address of the sponsor / agency (ies) (If any) :

_____

_____.

Documentation of the informed consent

I _____have read the information in this form (or it has been read to me). I was free to ask any questions and they have been answered. I am over 18 years of age and, exercising my free power of choice, hereby give my consent to be included as a participant in "_____

_____

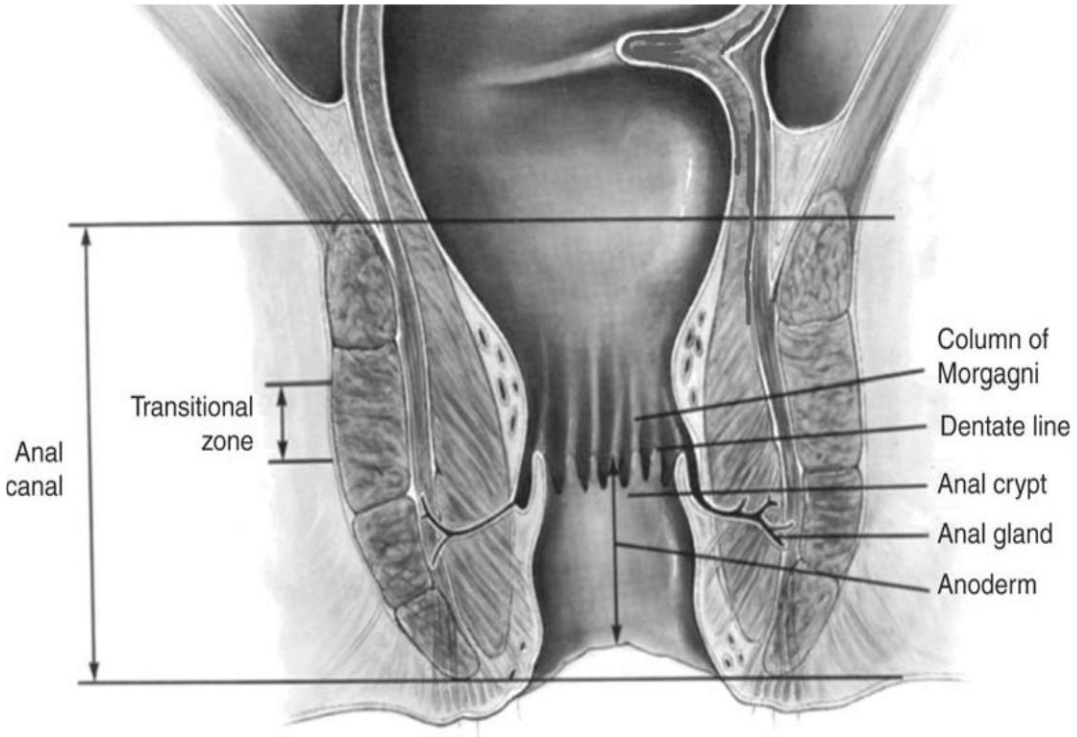
_____

_____" (title of the study).

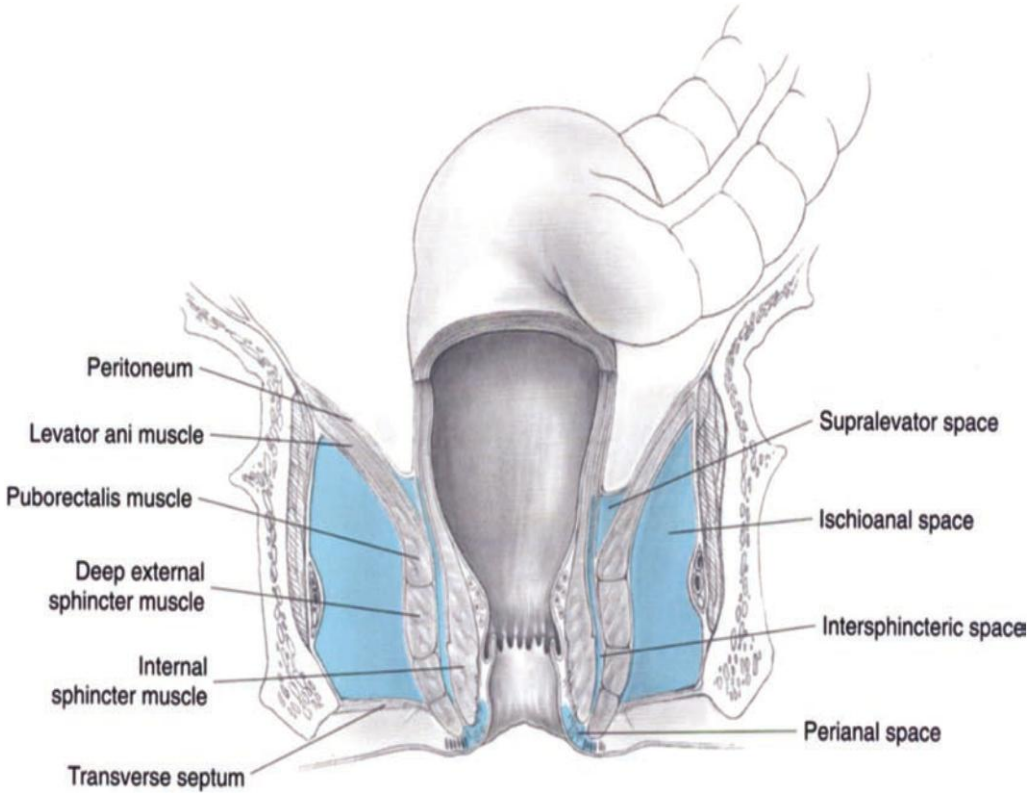
1. I have read and understood this consent form and the information provided to me.
2. I have had the consent document explained to me.
3. I have been explained about the nature of the study.
4. I have been explained about my rights and responsibilities by the investigator.
5. I have been informed the investigator of all the treatments I am taking or have taken in the past _____ months including any native (alternative) treatment.
6. I have been advised about the risks associated with my participation in this study.*
7. I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms.*
8. I have not participated in any research study within the past _____month(s).*
9. I have not donated blood within the past _____months-----add if the study involves extensive blood sampling.*
10. I am aware of the fact that I can opt out of the study at any time without having to give any reason and this will not affect my future treatment in this hospital.*
11. I am also aware that the investigator may terminate my participation in the study at any time, for any reason, without my consent.
12. I hereby give permission to the investigators to release the information obtained from me as result of participation in this study to the sponsors, regulatory authorities, Govt. agencies, and IEC. I understand that they are publicly presented.
13. I have understand that my identity will be kept confidential if my data are publicly presented .

14. I have had my questions answered to my satisfaction.
15. I have decided to be in the research study.

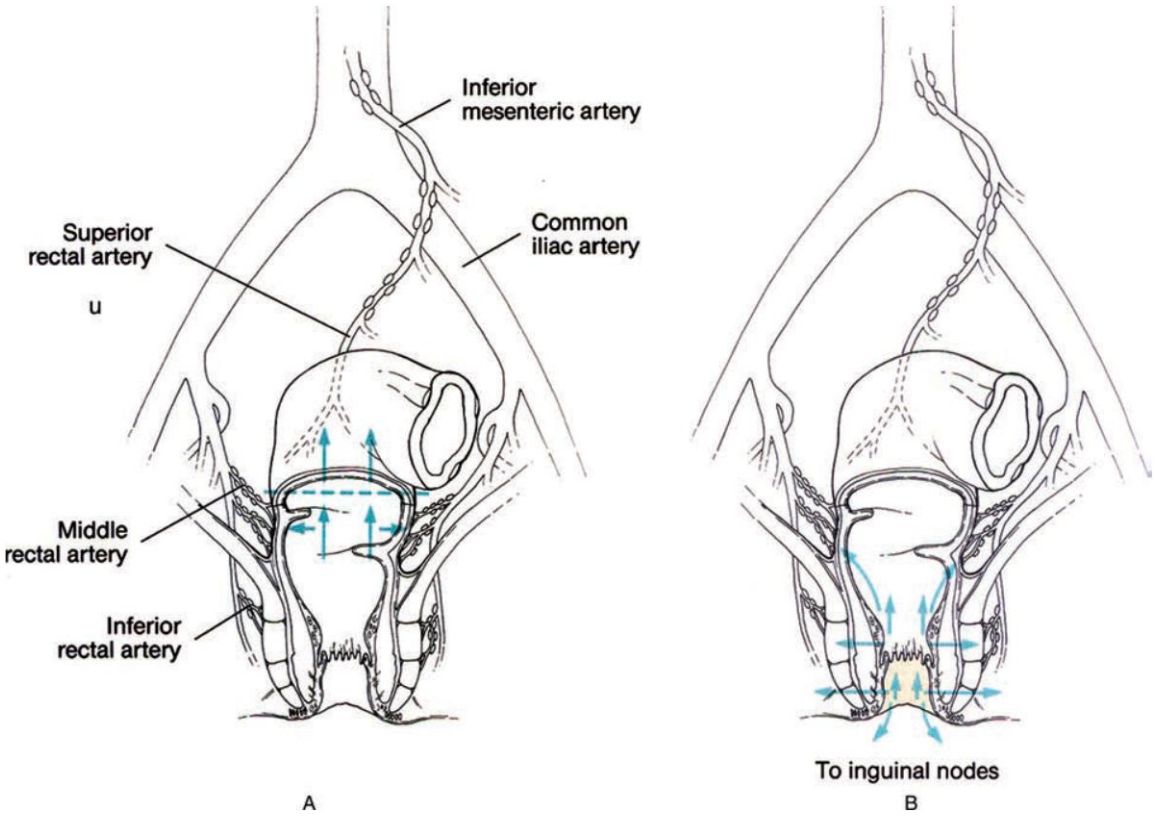
I am aware that if I have any question during this study, I should contact the investigator. By signing this consent form I attest that the information given in this document has been clearly explained to me and understood by me, I will be given a copy of this consent document.



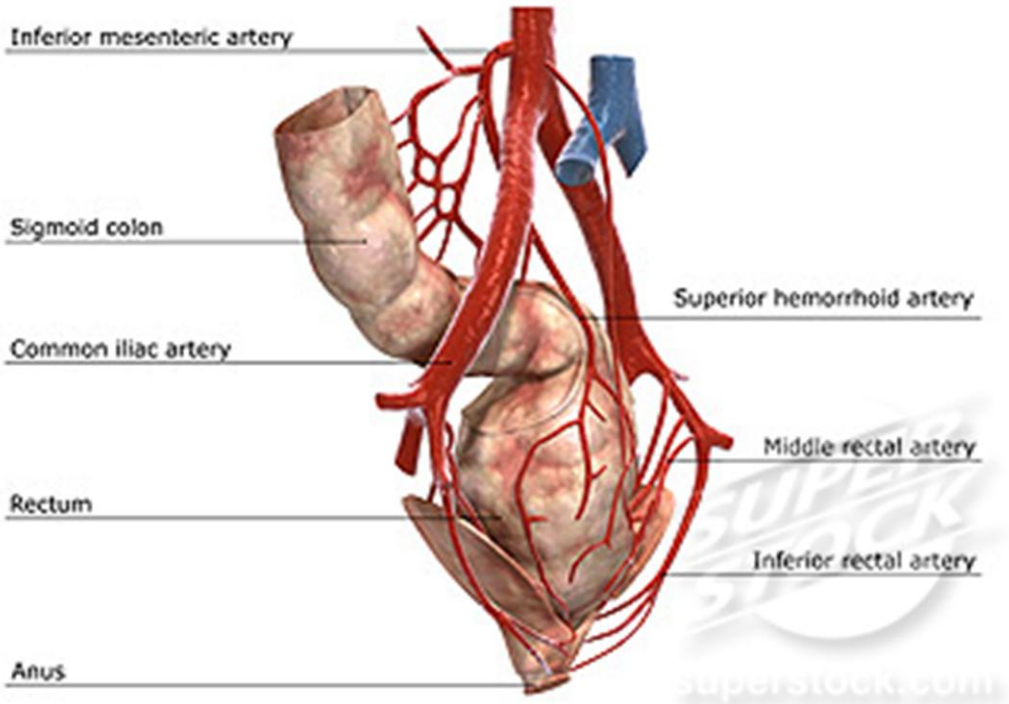
Anal canal surgical anatomy

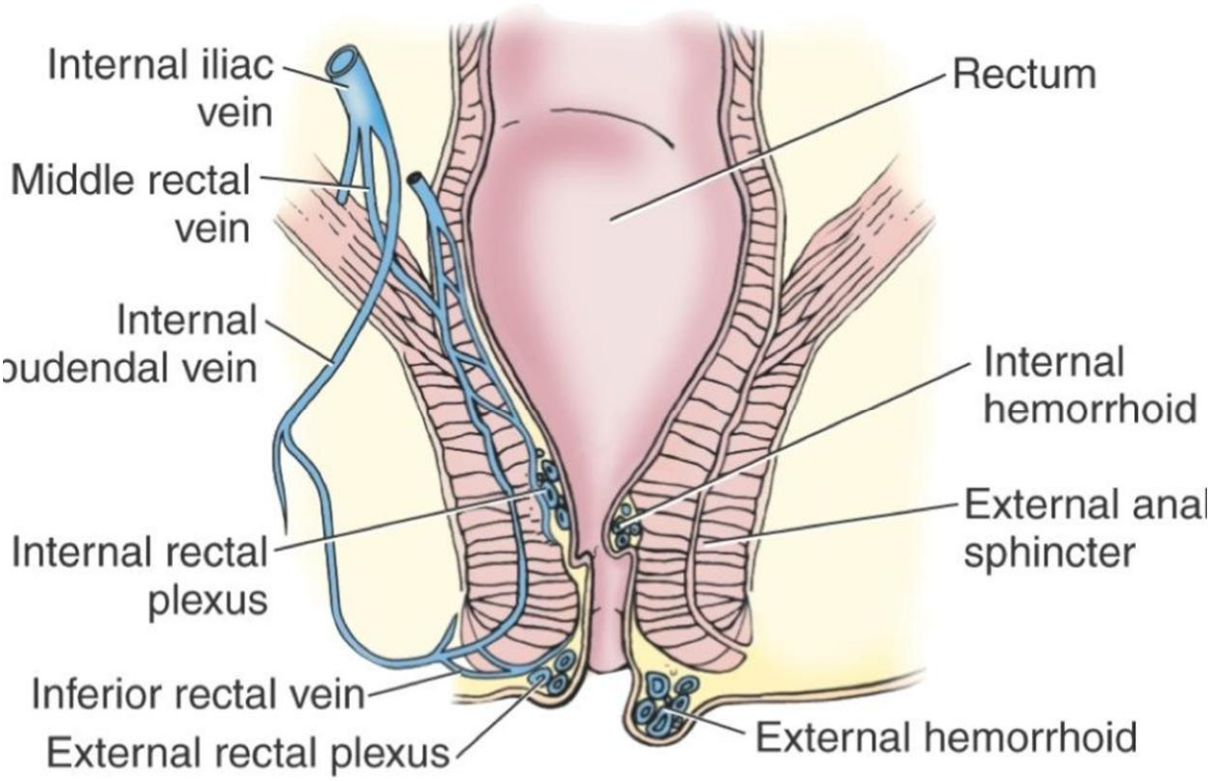


Perianal space

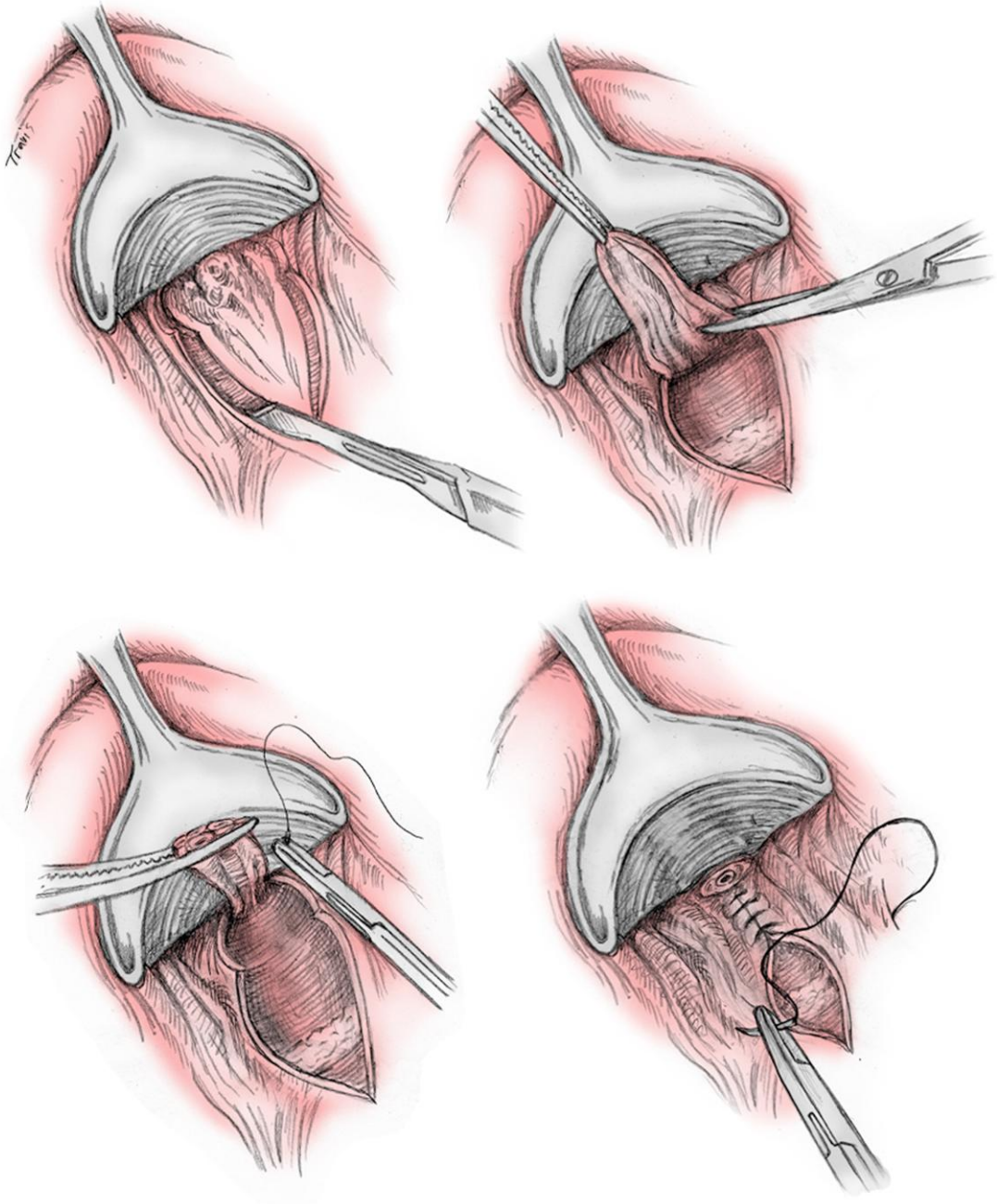


lymphatic drainage of anal canal

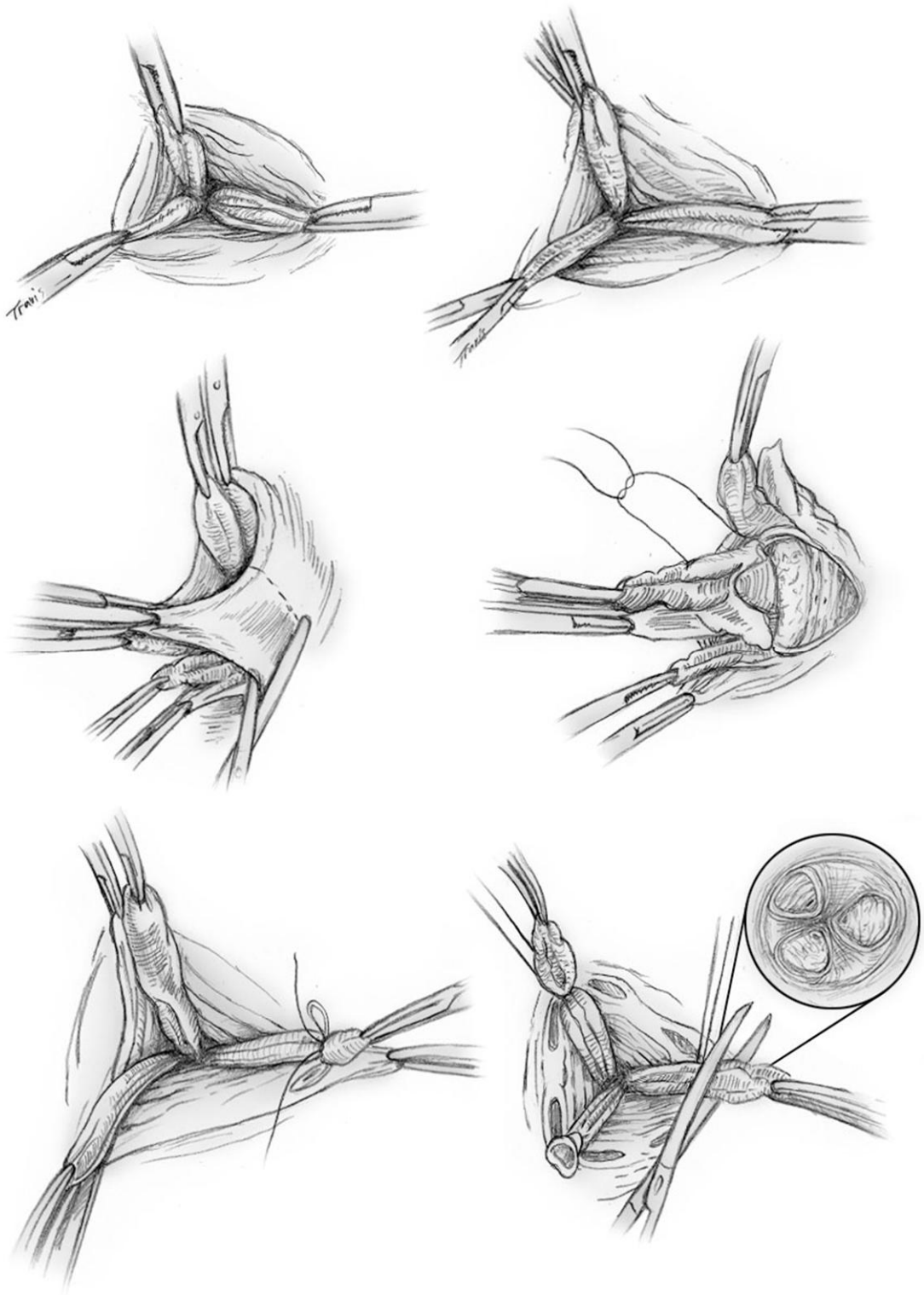




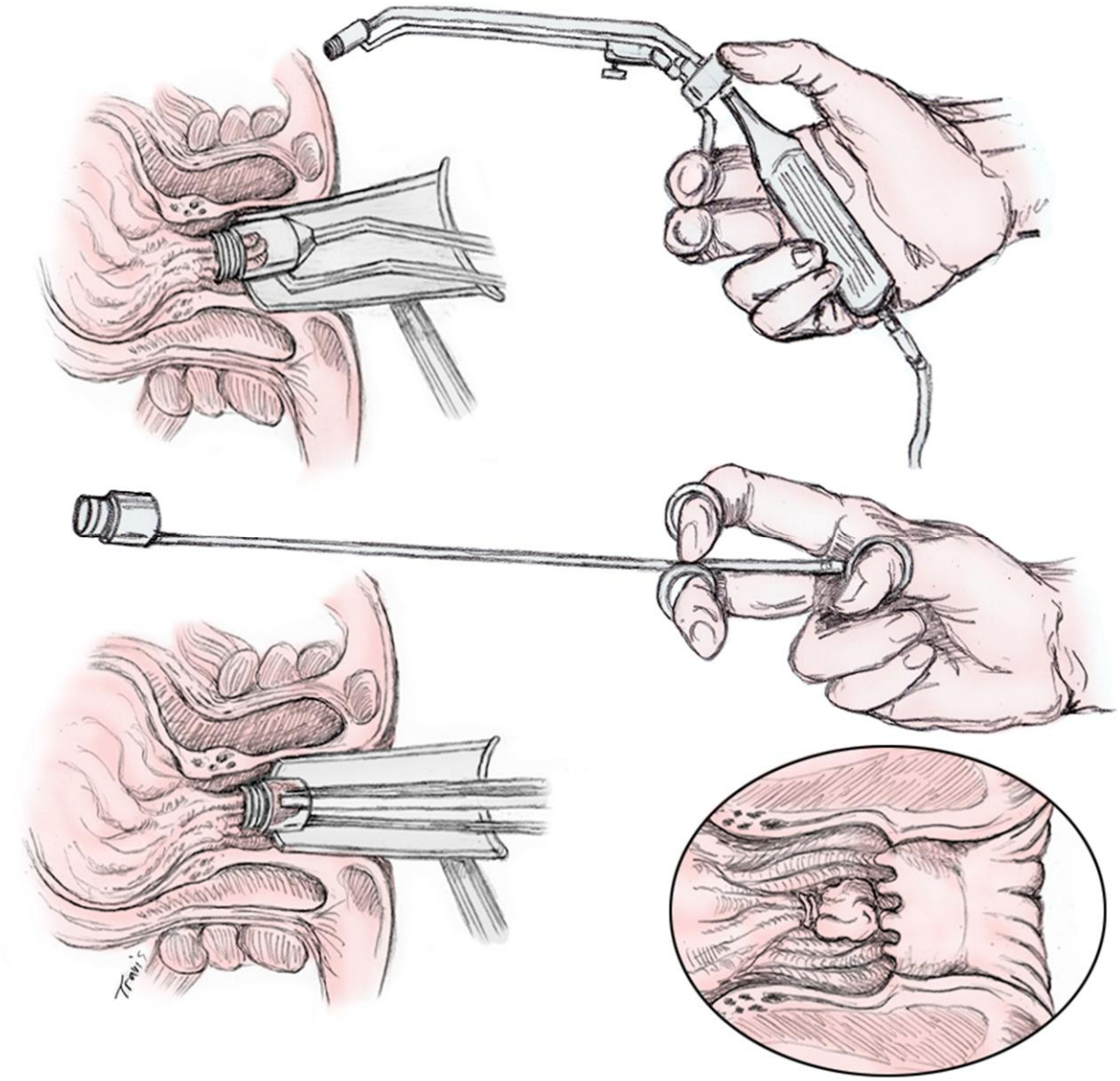
venous system of anal canal



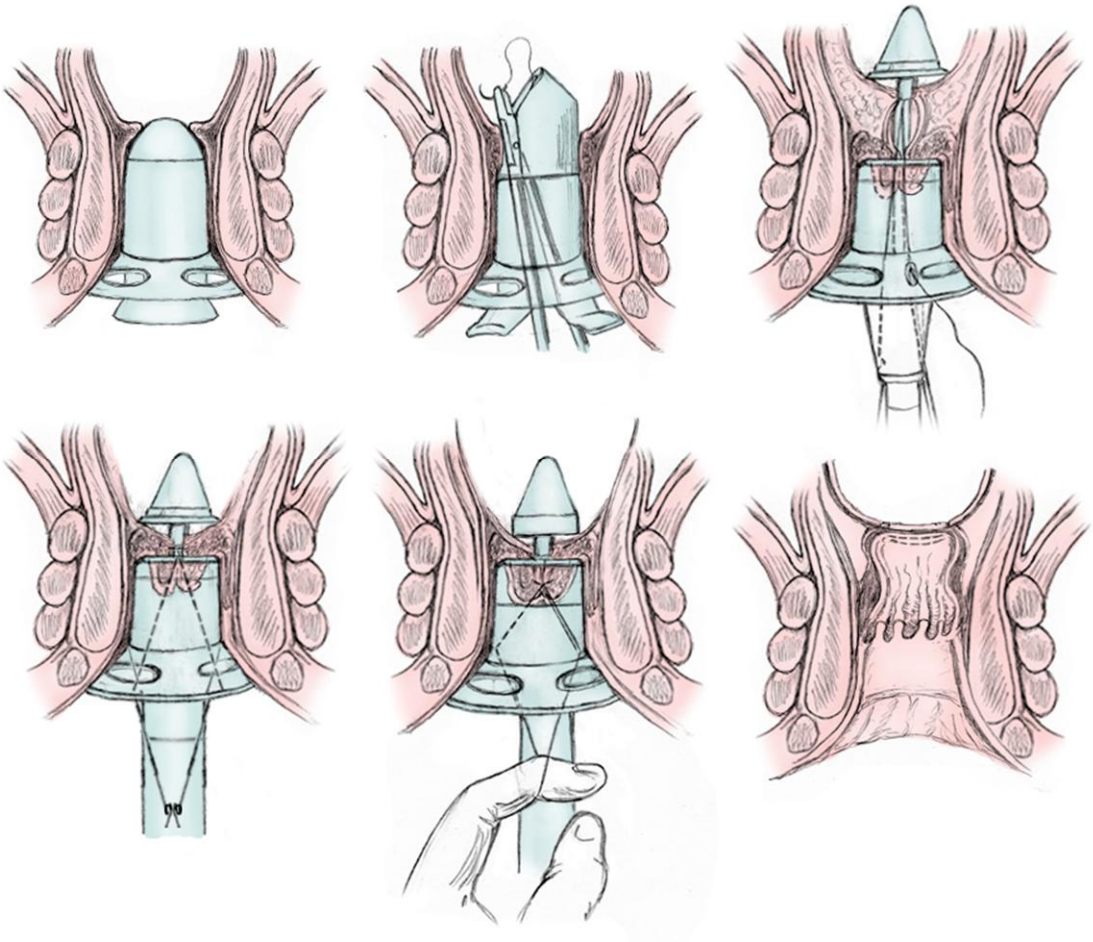
closed haemorrhoidectomy



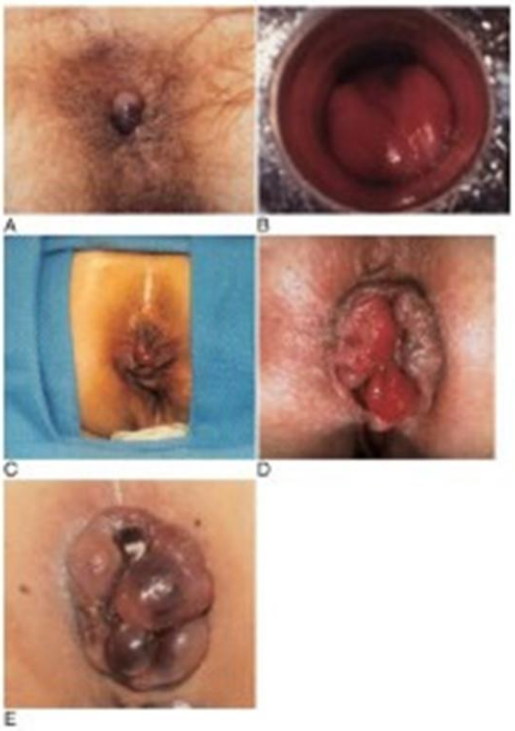
Open haemorrhoidectomy



Rubber band ligation



Stapler haemorrhoidopexy

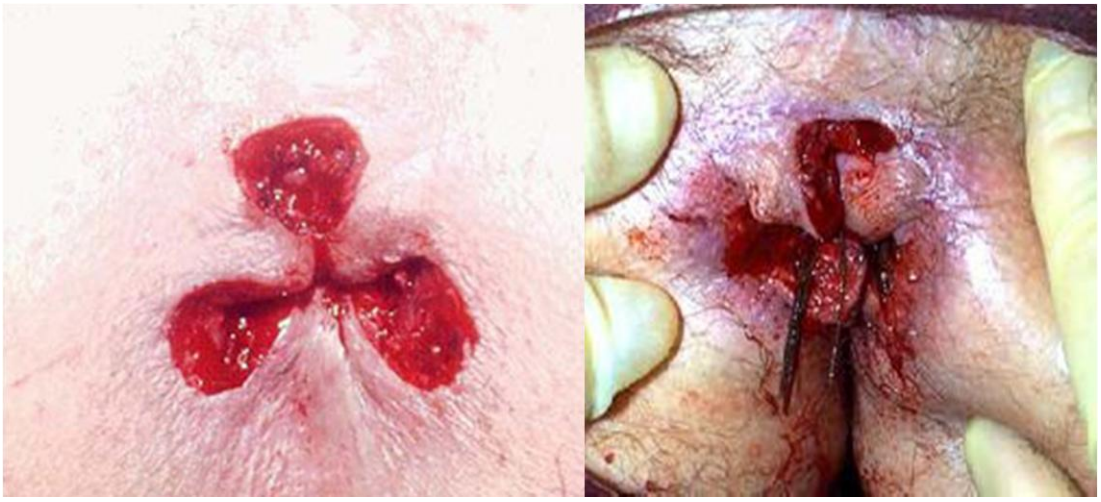


Hemorrhoids. **A,** Thrombosed external. **B,** First-degree internal viewed through anoscope. **C,** Second-degree internal prolapsed, reduced spontaneously. **D,** Third-degree internal prolapsed, requiring manual reduction. **E,** Fourth-degree strangulated internal and thrombosed external. *(by permission of Mayo Foundation.)*

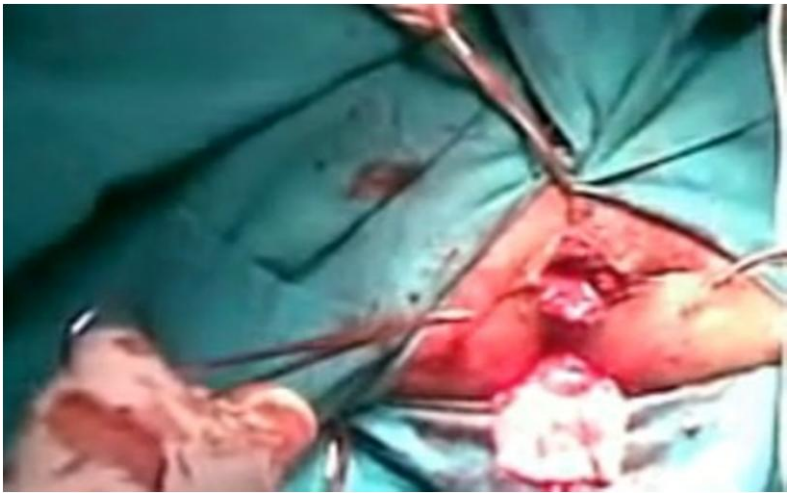
Photograph 3: Post operative Grade-4 Haemorrhoids

Grade III haemorrhoids

Grade IV interno external haemorrhoids



Post open haemorrhoidectomy



Post closed haemorrhoidectmy